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ECONOMIC RELATIONSHIP OF GRAZING FEES AND PERMITTED USE OF PUBLIC RANGELANDS TO NET INCOME OF WESTERN LIVESTOCK RANCHES: A REGIONAL ANALYSIS

~~Bureau of Land Management~~
~~764 Horizon Drive~~
~~Grand Junction, Colorado 81501~~

Administrative Report
to
Bureau of Land Management
U. S. Department of the Interior
and
Forest Service
U. S. Department of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE
Economic Research Service
Farm Economics Division

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FOREWORD

The Bureau of Land Management and the Forest Service jointly requested the Farm Economics Division of the Economic Research Service of the U. S. Department of Agriculture and several State Agricultural Experiment Stations in the West to make a research evaluation of the effects of alternative levels of grazing fees and adjustments in privileges on the organization and net returns of various sizes and types of cattle and sheep ranches that use public grazing lands in the Western States. Early in 1961, an interagency study group was established to plan and conduct the study. The Bureau of Land Management and the Forest Service contributed financial support to the study and made their records available.

The study was made by the Range and Ranch Management Investigations Group of the Farm Economics Division, Economic Research Service, U. S. Department of Agriculture; and Agricultural Economists of Montana State College, Utah State University, and Arizona State University, the Forest Service, U. S. Department of Agriculture, and the Bureau of Land Management of the U. S. Department of the Interior.

The study group membership consisted of:

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Technical Advisors to the study were:

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Robert S. Rummell, Forest Service, Washington, D. C.

This report in which the results of income comparisons and supplementary analyses are set forth and interpreted was prepared in the Farm Economics Division for administrative use. The Farm Economics Division takes full responsibility for the interpretation of the analysis and the conclusions. The study does not develop recommendations for specific levels, or procedures for the establishment of levels, of grazing fees and privileges.

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SUMMARY AND CONCLUSIONS

1. Representative cattle and sheep ranches in the Western region were covering cash costs in 1960 with income and costs calculated at projected prices and at 1953-60 average prices. However, 1 out of the 14 sheep operations and 11 out of the 66 cattle operations that were budgeted failed to cover cash costs plus depreciation. Thirty-five of the 80 budgeted ranches--31 cattle ranches and 4 sheep ranches--were not covering a charge for family labor in addition to cash costs and depreciation. The cattle ranches which did not cover cash costs plus depreciation had less than 250 animal units and the sheep ranch which did not cover cash costs plus depreciation had 73 animal units. On the average, a cattle rancher needed about 360 animal units and an investment of about $200,000 to cover all costs except a return on his investment. The same type of estimate was not made for sheep ranches because of the small number and because the variation in income was so great.

Net ranch income is governed by the accounting procedure used as well as the cost-price relationship considered. If a rancher chooses to disregard all costs except cash costs, he may feel that he is well off in the shortrun. But when all costs other than interest on investment were charged against the ranching business, none of the 80 representative ranches that were budgeted were making as much as 5 percent return on investment. Substituting 1953-60 average prices for the projected prices in the budgets for the representative cattle and sheep ranches increased the average net cash income by $1,249, or 5.05 percent. The difference in the two sets of prices was equivalent to about 83 cents a hundredweight for beef cattle. This was a relatively small difference, yet it had a significant effect on the gross receipts of a cattle rancher who had 400 or more animal units. For him the difference would mean about $9,000 additional income.

2. Net cash income per animal unit of both cattle and sheep ranches increased at first and then decreased as the size of the ranch increased. For cattle ranches, the average net cash income per animal unit was $24.74 for ranches having less than 150 animal units, $25.93 for ranches having 151-400 animal units, $25.00 for ranches having 401-650 animal units, and $23.33 for those having over 650 animal units. Average net cash incomes for four representative sizes of sheep ranches were $21.50, $33.00, $29.00, and $16.00 per animal unit. As an average, all costs--cash costs, depreciation and family labor--were greater than total income per animal unit on all size groups of cattle ranches up to 400 animal units. The average net income above all costs per animal unit for the 66 cattle ranches, by size groups, was $-27.42, $-1.07, $-2.88, $7.47, and $9.75. The average net income above all costs per animal unit for the 14 sheep ranches that were budgeted was, by size groups, $-35.50, $2.50, $6.00, and $5.80. The average rates of return on current investment on cattle ranches ranged from -4.18 percent on the group of smallest operations to 1.92 percent on the group of largest operations. The corresponding range on sheep ranches was from -7.04 percent on the small operations to 1.57 percent on the group of largest operations. The lower rates of return on the sheep ranches were due to a slightly lower return and a slightly highe cost per animal unit than on the cattle ranches. Incomes, costs, and rate of returns varied greatly by location and type of ranch. The average investment per animal unit was $597 on the cattle ranches and $488 on the sheep ranches.

The impact of grazing fees on ranchers' net incomes is not as great as one might believe. Grazing fees represented only a small percentage of ranch operating expenses. Thus a significant increase in grazing fees would not shift many ranchers from a plus to a minus net income position. But an increase in fees would reduce net ranch income.

At the average level of fees paid by ranchers in 1960 (BLM 20 cents, FS 60 cents per AUM), the fees were 4.5 percent of total cash costs on cattle ranches and 3.2 percent on sheep ranches. The range was from 1 percent to 20 percent on individual ranches. At the next higher level of fees considered (BLM 40 cents, FS 80 cents), the fees would average 7.8 percent of total costs for the cattle ranches and 5.3 percent for the sheep ranches. At the highest level of fees considered (BLM $1.00, FS $1.40), the fees would be 14.8 percent of cash costs for cattle ranches and 11 percent for sheep ranches. The average fees paid by all budgeted cattle ranches would be $451 per ranch at the 1960 level of fees, $856 at the $0.40-$0.80 level of fees, and $1,823 at the $1.00-$1.40 level. The average fees paid by all budgeted sheep ranches would be $1,291 per ranch at the 1960 level of fees, $2,217 at the $0.40-$0.80 level, and $5,021 at the $1.00-$1.40 level. The numbers of the 66 representative cattle ranches and the 14 representative sheep ranches that would not cover all costs except interest on investment at the three specified levels of grazing fees were as follows:

	Fees per AUM		
Kind of ranch	$0.20 BLM 0.60 FS	$0.40 BLM 0.80 FS	$1.00 BLM 1.40 FS
Cattle	31	33	42
Sheep	4	6	8

The number of representative ranching operations that would fail to cover all costs except interest on investment as fees were raised, would increase at the rate of 1 percent for each 4.7 percent increase in fees, on the average.

4. Most of the ranchers could make some adjustments in their operations which would tend to offset a reduction in grazing privileges on the public range. As an average, however, a 20-percent reduction in permitted use would reduce net income $1,319 on the budgeted cattle ranches and $3,038 on the budgeted sheep ranches. The amount of the reduction in net income varied greatly among individual ranches because of differences in the kinds and sizes of grazing permits and the relationship between range and base property. Generally, a 20-percent reduction in actual permitted use would not be fully reflected in the livestock inventory. The reduction in inventory would be about 8.3 percent of the 20 percent reduction in permitted numbers for each month of duration of the permit. A full 20 percent reduction in inventory of animals would usually occur only with a yearlong permit.

   Just which item of ranch cost or income would be affected by a permit reduction would depend on how efficiently the ranch is being operated at the time of the cut, whether there are currently unused capacities in the owned feed and forage resources, the potential supply and cost of rented pasture and range, and the financial and physical limitations on making adjustments in the operation of the ranch. The average effect of a 20-percent reduction in permitted use for all budgeted cattle and sheep ranches would be as follows:

Item	Cattle ranches	Sheep ranches
Reduction in gross income	$1,946	$5,471
Reduction in cash costs	548	2,182
Reduction in depreciation	79	251
Reduction in net income	1,319	3,038

With the above effects on costs and income, 8 additional budgeted cattle ranches--a total of 39 out of 66--and 5 additional budgeted sheep ranches--a total of 9 out of 14--would not cover all costs after a reduction of 20 percent in permitted use.

5. Because of a tendency to capitalize ranch income into values of headquarters and other owned land, any increase in grazing fees or a reduction in grazing permits--like any other factors that reduce ranch income--would tend to lower the capital value of such property. To the extent that this occurred, increases in grazing fees would lead to capital losses for owner-operators of ranches. It would, however, represent only a paper loss until sale of the property.

6. The feed value of a grazing permit is difficult to determine. Although in present fee formulas each animal unit month is given equal weight, many variables, such as size of the permit, its duration, other permits with which it is associated, the quantity and quality of owned land resources, and level of management jointly determine the value of a permit to a rancher.

ECONOMIC RELATIONSHIP OF GRAZING FEES AND PERMITTED USE OF PUBLIC RANGELANDS TO NET INCOME OF WESTERN LIVESTOCK RANCHES:
A REGIONAL ANALYSIS

The importance of the public rangelands to the western livestock industry is indicated by their extent. In 1960, 57 million acres of the rangeland on National Forests in the western region, 6 million acres of range on National Grasslands, and 178 million acres of the rangelands of the Bureau of Land Management in the West, a total of 242 million acres, were used by ranchers. The total amount of land in the Western States under the jurisdiction of these two agencies is 315 million acres; about 70 percent of which was used in 1960 for grazing 12.6 million head of sheep and 13.9 million head of cattle. Of these numbers, the National Forests provided grazing for 1.1 million cattle and 2.5 million sheep; Bureau of Land Management lands provided grazing for 7.4 million sheep and 3.3 million cattle. These totals do not include the several million calves and lambs under 6 months of age grazed free of charge.

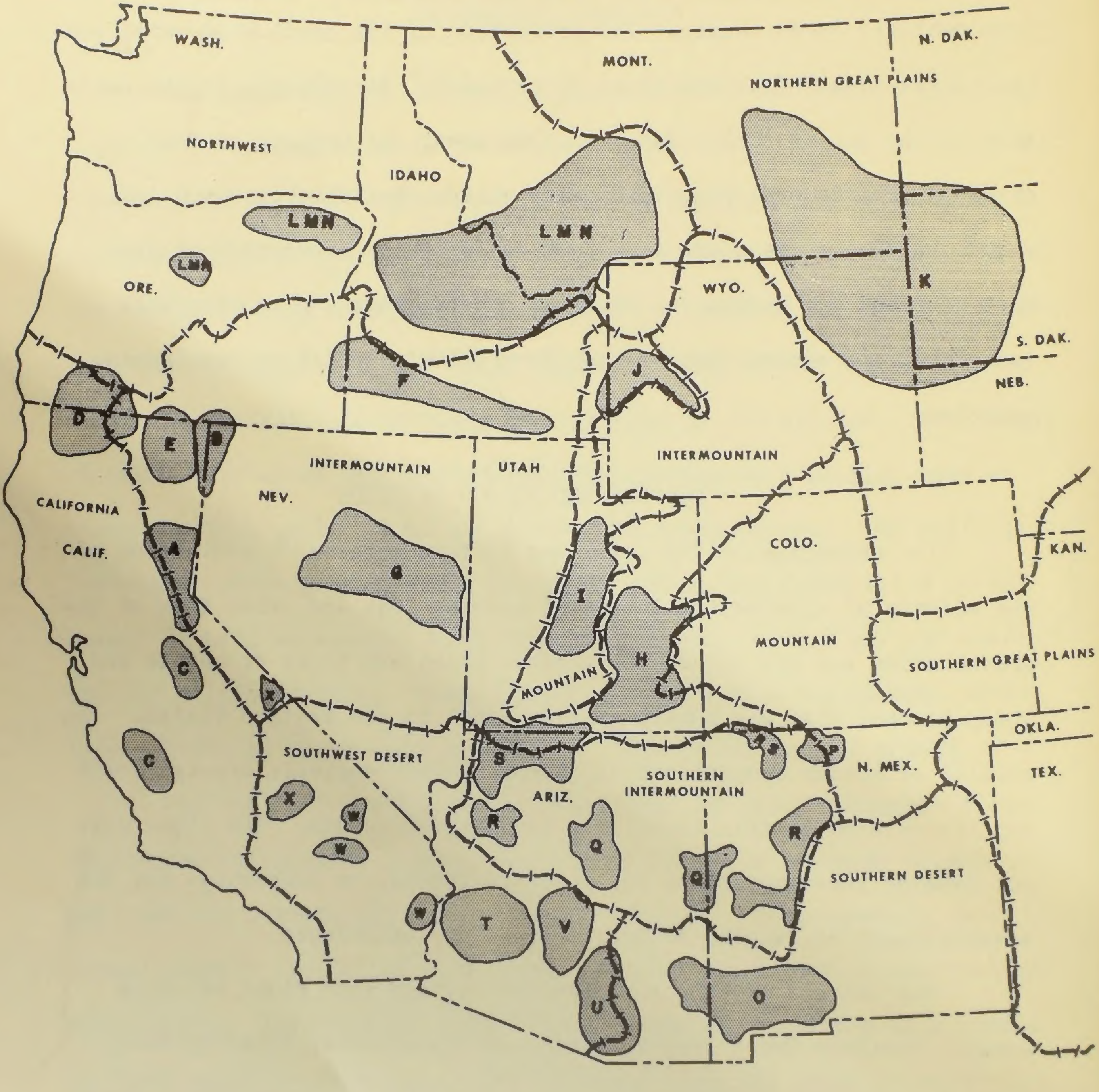
For the 1960 grazing season the Bureau of Land Management issued 16,164 regular grazing permits and the Forest Service issued 16,445 paid grazing permits for use on western forests. Some ranchers were issued permits for use of both Forest Service and Bureau of Land Management ranges. The relative importance of Federal rangelands as a source of feed varies considerably among ranching areas and among localities. In general, the proportion of feed obtained from public lands varies directly with the duration of the grazing period. For example, a ranch using ranges on the National Forest for three months or less was found to be getting 22 percent of its feed from public land; another ranch obtained 50 percent of its total feed by grazing Bureau of Land Management lands for six months during spring, summer, and fall; and where grazing was on a yearlong basis, 80 to 90 percent of the year's feed was from publicly owned ranges. The proportion of the total herd using public ranges also influences these percentages. In addition to the variance in the use of public range in each area, the amounts of feed obtained from Federal rangelands also varies considerably among individual ranches. There are many reasons for this. Some ranches have more cropland and meadow pasture than others; some own considerable rangeland; and others lease ranges from private owners or non-Federal agencies.

PURPOSE AND METHOD OF STUDY

The objective of the study was to make a research evaluation of the effects of alternative levels of grazing fees and privileges on the organization and net returns of various sizes and types of cattle and sheep ranches that use public grazing lands in the Western States. The results of income comparisons and supplementary analysis are set forth and interpreted in this report for administrative use. The study does not develop recommendations for specific levels, or procedures for the establishment of levels, of grazing fees and privileges.

The western livestock region was divided into eight ranching areas: Northern Great Plains, Northwest, California, Intermountain, Mountain, Southern Intermountain, Southern Desert, and Southwest Desert (figs. 1 and 2). The ranching areas were differentiated on the basis of similarities in native vegetation, climate, and systems of range livestock production. Within each ranching area the most common types of ranches were selected for study. Ranch types were classified by the following criteria:

RANCHING AREAS OF THE WEST AND GENERAL LOCATION OF CATTLE RANCHES STUDIED



LEGEND: —|—|— Boundary between ranching areas. ——— General location of ranches studied.

CATTLE RANCH TYPES:

A=(BLM-O) (FS-S)
B=(BLM-S) (FS-O)
C=(BLM-Sp,S) (FS-O)
D=(BLM-Sp,S,F) (FS-O)
E=(BLM-Sp,F) (FS-S)
F=(BLM-Sp,S,F) (FS-O)
G=(BLM-Sp,S,F,W) (FS-O)
H=(BLM-F,W,Sp) (FS-S)
I=(BLM-O) (FS-S)

J=(BLM-Sp,F) (FS-S)
K=(BLM-Y) (FS-O)
L=(BLM-O) (FS-S)
M=(BLM-Sp,F) (FS-O)
N=(BLM-Sp,F) (FS-S)
O=(BLM-Y) (FS-O)
P=(BLM-O) (FS-S)
Q=(BLM-O) (FS-Y)
R=(BLM-Y) (FS-O)

S=(BLM-F,W,Sp) (FS-S)
T=(BLM-Y) (FS-O)
U=(BLM-Y) (FS-O)
V=(BLM-F,W,Sp) (FS-O)
W=(BLM-W) (FS-O)
X=(BLM-W,Sp,S) (FS-O)

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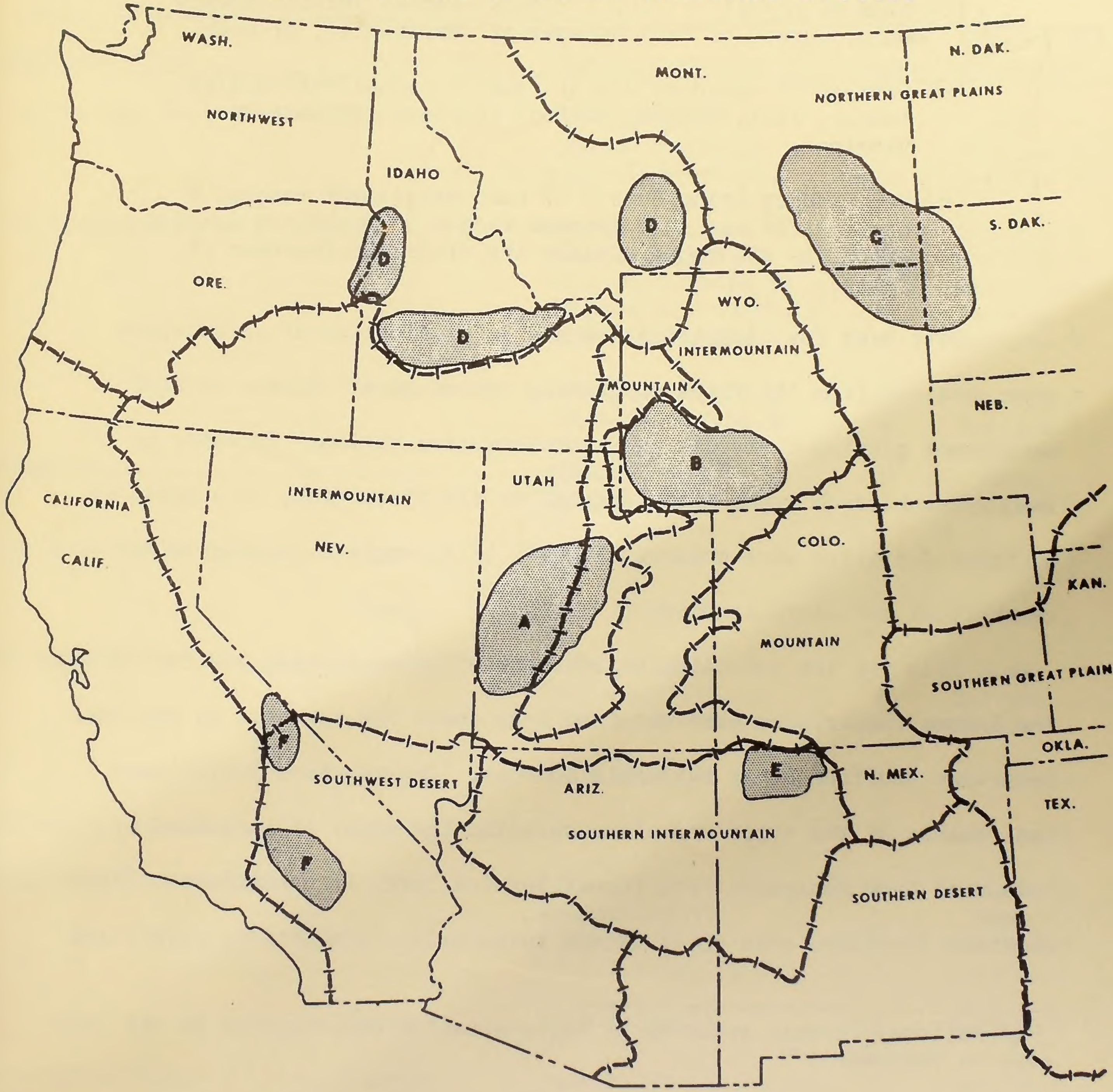
FIGURE 1

RANCHING AREAS OF THE WEST AND GENERAL LOCATION OF SHEEP RANCHES STUDIED



SHEEP RANCH TYPES:

A=(BLM-F,W,Sp) (FS-S)
B=(BLM-F,W,Sp) (FS-S)
C=(BLM-Y) (FS-O)
D=(BLM-Sp,F) (FS-S)
E=(BLM-Y) (FS-O)
F=(BLM-Sp) (FS-O)

LEGEND:

—I—I— Boundary between ranching areas.
———— General location of ranches studied

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FIGURE 2

(a) Kind of livestock raised--cattle or sheep.

(b) Kind of permit on public ranges--Forest Service permit only, Bureau of Land Management permit only, or both.

(c) Pattern of seasonal use of Federal rangelands--spring, summer, fall, winter, various seasonal combinations, or yearlong.

(d) For ranches using Bureau of Land Management ranges, a distinction was made between ranges in organized grazing districts and those outside the districts (Section 15 lands).

Data used for classification and identification of ranch types were obtained from the files on grazing leases of all Bureau of Land Management grazing districts and representative National Forests. 1/ Twenty-seven ranch types with from one to six sizes each, or a total of 80 types and sizes were chosen. Table 1 is a complete listing of the ranch types and sizes studied.

Data for the selection of 80 representative ranches and for making the income comparisons were obtained from about 700 ranchers by personal interview and from other available sources. The ranchers interviewed had ranches of the types and sizes selected for study as indicated by Bureau of Land Management and Forest Service lists of permittees. These ranchers furnished data on livestock inventories, production, sales, and

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1/ National Forests selected as representative and included in the study were as follows:

California area - El Dorado, Plumas, Sierra, and Tahoe.
Intermountain area - Big Horn and Medicine Bow.
Mountain area - Rio Grande, Uncompahgre, Roosevelt, White River, Carson, Ashley, Manti-LaSal, Bridger, Cache, and Dixie.
Northwest area - Beaverhead, Gallatin, Lewis & Clark, Wallowa-Whitman, Boise, Challis, Sawtooth, and Targhee.
Southern Intermountain area - Apache, Coconino, and Prescott.
Southwest Desert area - Tonto.

Table 1.-Types and Number of Sizes of Ranches Studied, by Ranching Areas

Ranching area	Kind of livestock	Pattern of seasonal grazing 1/	No. of sizes	Type of BLM permit 2/
California	Cattle	(BLM-C)(FS-S)	4	None
		(BLM-Sp,S)(FS-C)	2	Section 15
		(BLM-Sp,S,F)(FS-C)	3	Section 15
Intermountain	Cattle	(BLM-S)(FS-C)	5	Section 3
		(BLM-Sp,F)(FS-S)	3	Section 3
		(BLM-Sp,S,F)(FS-C)	3	Section 3
		(BLM-Sp,S,F,W)(FS-C)	3	Section 3
		(BLM-F,W,Sp)(FS-S)	3	Section 3
	Sheep	(BLM-F,W,Sp)(FS-S)	2	Section 3
		(BLM-F,W,Sp)(FS-S)	6	Section 3
Mountain	Cattle	(BLM-C)(FS-S)	2	None
		(BLM-Sp,F)(FS-S)	3	Section 3
Northern Great Plains	Cattle	(BLM-Y)(FS-C)	3	Section 3
	Sheep	(BLM-Y)(FS-O)	2	Section 3
Northwest	Cattle	(BLM-C)(FS-S)	3	None
		(BLM-Sp,F)(FS-C)	3	Section 3
		(BLM-Sp,F)(FS-S)	3	Section 3
	Sheep	(BLM-Sp,F)(FS-S)	2	Section 3
Southern Desert	Cattle	(BLM-Y)(S-C)	3	Section 3
Southern Intermountain	Cattle	(BLM-O)(FS-S)	2	None
		(BLM-O)(FS-Y)	3	None
		(BLM-Y)(FS-C)	3	Section 3
		(BLM-F,W,Sp)(FS-S)	3	Section 3
	Sheep	(BLM-Y)(FS-C)	2	Section 3
Southwest Desert	Cattle	(BLM-Y)(FS-C)	4	Section 3
		(BLM-Y)(FS-C)	4	Section 15
		(BLM-F,W,Sp)(FS-C)	1	Section 3

1/ BLM=Bureau of Land Management; FS=Forest Service; Sp=spring; S=summer; F=fall; W=winter; Y=yearlong; C=none.

2/ Section 3 = privileges on lands in organized grazing districts. Section 15 = lands outside organized grazing districts.

management practices; land resources used, seasonal patterns of use, yields and carrying capacities; labor used; investments in land and improvements, livestock, and machinery and equipment; and ranch operating expenses. Data collected from ranchers were supplemented by information from other research projects and from Bureau of Land Management and U. S. Forest Service files and records.

In using data from the farm records and from secondary sources to develop ranch budgets, a uniform set of assumptions and procedures was followed. The operating practices included in the budget for the 80 representative ranches were the practices normally found in the respective areas. Thus livestock herd management, replacement rates, cow-bull and ewe-ram ratios, lamb crop and calf crop, crop yields, marketing practices, herd size and composition, kinds and amounts of land used, and the other essential details that make up the ranch budgets describe how western livestock ranches are presently operated.

The budgets were used to determine the economic effect of different levels of grazing fees and a 20-percent reduction in grazing privileges. Starting with 20 cents per AUM (animal unit month) and 60 cents per AUM to represent the approximate 1961-62 fee levels for Bureau of Land Management and Forest Service ranges, the cost and income effects of increments in grazing fees of 20 cents per AUM from current levels to levels of $1.00 and $1.40, was calculated. It was assumed, for the purposes of this study that the Bureau of Land Management and Forest Service fees would increase simultaneously at a constant differential of 40 cents per AUM.

Each ranch was assumed to be fully owned. The land in each ranch was valued at an estimated market price. The building and equipment values were based on depreciated 1960 replacement costs. The livestock inventory values were based on projected market prices for livestock.

The projected U. S. prices used in the study were developed by the Farm Economics Division of the U. S. Department of Agriculture for conducting this study and other research studies. Comparable projected prices were developed for the Omaha livestock market for cattle and the Ogden livestock market for sheep (table 2). From these two price bases, the price projections were adjusted to ranching areas. This was done by relating the projected prices to the ratio of 1953-60 average prices on the base market to the prices for the same period at a centrally located market in each ranching area. The prices were then adjusted to each locality within each area by subtracting out an allowance for marketing and transportation charges. Seasonal prices were determined by relating the 1953-60 average prices for each month to the 1953-60 average annual price. The marketing practices and time of marketing used for each type of ranch included in the study were the typical patterns found. In addition to the estimates of gross receipts based on projected prices, the 1953-60 average prices at each locality were used to show the effect price changes have on net income. These gross income comparisons were made for each of the ranches in the California and Southern Intermountain ranching areas and for a few of the Intermountain ranches.

Other specific assumptions used in constructing the budgets were:

1. The capacity of ranch resources was fully utilized initially and would be under the conditions of a reduction in the grazing permit.

2. Cow-herd replacements were raised and all bulls were purchased. Annual expenses for bulls were based on (a) depreciation on the investment in bulls for their average life in the herd and (b) a death

Table 2. Prices for Cattle at Omaha, Nebraska and Sheep Prices at Ogden, Utah, and Projected Prices

Kind, Weight and Grade of Livestock	Monthly average prices per 100 pounds		
	1960 1/	1953-60	Projected
	Dollars	Dollars	Dollars
Omaha, Nebraska Market			
Cows, all weights			
Commercial	16.43	15.21	14.50
Utility	15.31	13.80	13.00
Bulls, all weights			
Utility	18.18	15.60	14.80
Feeders and Stockers			
Steers, 500-800 pounds			
Choice	26.61	24.05	23.00
Good	23.99	21.40	20.50
Heifers, 500-700 pounds			
Choice	24.16	21.25	20.25
Medium & Good	20.76	17.80	16.80
Good & Choice Calves, 300-500 pounds			
Steers	28.41	25.15	24.00
Heifers	25.71	22.05	21.00
Ogden, Utah Market			
Spring lambs, good & choice	21.25	20.38	22.23
Lambs, good & choice 2/	18.25	18.55	19.34
Feeder lambs, good & choice	17.00	17.46	17.95
Ewes, cull & utility	3.75	3.77	4.15

1/ Simple average of monthly prices.

2/ Includes average price of spring lambs May through September.

loss allowance based on a percentage of the investment in bulls. Death losses for other livestock were allowed in computing production and sales.

3. Buildings, improvements, machinery, and equipment inventories were developed for the budgets according to the kinds, sizes, and numbers of these items reported by ranchers. Depreciation was computed by the straight line method.

4. The inventory value of land used was a derived value. First the entire ranch was valued as a unit, then the other components of total ranch value were subtracted, leaving a residual value for land.

5. The estimate of the amount of labor used on the ranch was based on typical situations, as reported in the survey. Hired labor was valued at 1960 rates prevailing in the locality. The operator's labor was charged at the rate of a full-time hired man. Family labor used was valued at equivalent hired labor rates. For the smaller ranches on which operator labor requirements were less than full time, the operator's wage was adjusted accordingly.

6. The family home was not included in total ranch investment. Depreciation and repair costs on the ranch home were treated as family expenses not chargeable as a ranch expense. Similarly, only the ranch business share of telephone,utility, and passenger automobile costs were included in the budgets.

7. Although the sampling procedure was designed to obtain data from cattle and sheep ranches rather than diversified farms, information was collected on all crops grown and on other livestock on the ranch. When the ranch budgets were constructed, enterprises other than range livestock and livestock feed were considered typical if they were found on 50 percent or more of the ranches in each sample. The most common additional enterprise was cash grain.

8. Range livestock budgets were built around the total annual feed and forage requirements for the basic herd. They were constructed on the basis of animal unit months of feed required for the typical feeding and production practices. In determining total and seasonal feed requirements, the following standards of animal unit equivalents were adopted: mature cow, 1.0; long yearling, 0.8; weaned calf, 0.6; unweaned calf, 0.4; pregnant heifer, 1.0; bull, 1.25; 5 mature sheep, 1; and a mature horse, 1.5. These basic standards were based on feeding standards. These weights were modified as necessary in the various ranching areas when sample data and secondary data indicated a difference existed from the standard.

9. Animal unit months of feed required or consumed, based on feeding standards, are not identical with AUM's of permitted or actual use of public ranges. Since the Federal agencies base their permit and license billings on a standard of any animal 6 months of age or over as 1.0 counted animal, an AUM of permitted range use may actually be equal to, more, or less than one AUM of actual feed. Ordinarily each permitted AUM represents more than one feed AUM. In this report, the terms "feed AUM" and "permitted AUM" are used to help distinguish between government agency accounting procedures and actual feed requirements.

BUDGET SUMMARIES AND INCOME AND EXPENSE STATEMENTS

Introduction

Summaries of the major components of income and expenses for the 80 representative ranches are summarized in this section. Considerable variation from ranch type to ranch type in cost, income, and investment reflects the effect of physiographic and economic differences among ranching areas.

Although a primary purpose in constructing the ranch budgets was to bring out and to emphasize the differences between areas and between types and sizes of ranches, and to bring out the reasons for the differences, there are noticeable similarities and evidences of correspondence in the totals of many components. To emphasize this correspondence, several of the more important items of costs and income and the more important production relationships were weighted by an animal unit equivalent index which was developed for each type and size of operation. Use of this index permits a more direct comparison between types and sizes of ranches with respect to cost, income, and production. When the values were compared on the basis of a common denominator, their differences and similarities are more apparent.

Land Used in Cattle and Sheep Production

The land resource of ranches in the Western States is extremely variable in composition and in number of acres. It varies according to the types of land available for livestock production, the relative amounts of crop, pasture, and rangeland in the base units, and the amount of forage obtained from the Federal grazing lands.

Cattle Ranches

Throughout much of the West, cattle ranches usually have hay land, irrigated pasture, and owned and leased rangeland in the base unit. In many areas, ranches also include a small amount of cropland. The crop and meadow lands are used to provide hay and grain for winter feeding, pasture, and aftermath grazing. However, in the Southern Desert area, Southwest Desert, and portions of the Southern Intermountain area, where animals are grazed on the range yearlong, cattle ranches are operated entirely on rangeland. Supplemental feeds needed during dry periods are purchased.

The acreage of land needed to carry an animal unit is related to the quality and type of land in the base unit and the amount of forage obtained from Federal grazing lands. In some areas such as the Mountain areas of California, Utah, and western Montana or northern Idaho, ranches may have a permit to graze animals on National Forest lands for only a few months during the summer. Animals must be carried on private lands, either owned or leased, for a major part of the year. In other areas ranchers may have permits on Bureau of Land Management ranges in the spring and fall and on National Forest lands during the summer. This pattern is typical in northeastern California, southern Wyoming, northern Colorado, and in some areas of the Northwest. In parts of the Intermountain, the Southern Intermountain, the Southwest Desert, and the Southern Desert areas many operators have yearlong grazing permits on Federal lands, and the base unit may be quite small with Federal ranges furnishing a major part of total feed requirements.

Since the types of land in base units are different and because the size of the grazing permits varies, the amount of owned land required per animal unit changes with ranching area, with the type of grazing permit, and with the number of head of livestock owned. Differences among types and sizes of ranches in the acreage of owned and leased land in typical ranch units and in animal unit months of forage obtained from Federal lands are shown in tables 3 and 11. Ranches in California with summer permits on National Forest rangelands, for example, have from about 11 to 18 acres of land in the base unit per animal unit in the livestock herd. Percentages of total feed obtained from Forest Service

Table 3.- Cattle ranches: Size of ranch and total investment

Ranching area and Type of ranch 1/	Size of ranch			Total investment 5/	
	Cows 2/	A.U.'s equiv. 3/	Land owned and leased 4/	Per ranch	Per A.U.
	Number	Number	Acres	Dollars	Dollars
California Area					
FS privileges only 6/					
(BLM-0)(FS-S)	50	69	1,230	51,403	745
	85	120	1,535	78,654	655
	150	235	2,664	151,044	643
	275	420	7,360	220,843	526
(BLM-Sp,S)(FS-0) 7/	49	76	2,668	76,417	1,005
	190	277	5,602	145,547	525
(BLM-Sp,S,F)(FS-0) 7/	74	101	1,993	55,873	553
	113	177	5,177	116,810	660
	242	323	5,632	164,791	510
Intermountain Area					
BLM privileges only					
(BLM-S)(FS-0)	72	122	1,441	78,149	641
	229	321	2,826	169,110	527
	374	557	5,790	300,711	540
	590	881	5,660	350,490	398
	1,137	1,960	20,517	941,546	480
(BLM-Sp,S,F)(FS-0)	50	72	474	49,018	681
	166	233	1,813	111,901	480
	465	694	4,926	271,874	392
(BLM-Sp,S,F,W,)(FS-0)	58	77	392	49,536	643
	187	264	847	114,852	435
	437	600	2,022	226,524	378
BLM & FS privileges					
(BLM-Sp,F)(FS-S)	65	104	922	65,000	625
	175	263	2,790	157,000	597
	400	650	4,299	247,005	380
(BLM-F,W,Sp)(FS-S)	61	87	540	60,094	691
	175	236	1,045	123,790	525
	345	466	2,458	227,107	487
Mountain Area					
FS privileges only					
(BLM-0)(FS-S)	50	95	242	74,345	783
	170	240	1,348	140,395	585
BLM & FS privileges					
(BLM-Sp,F)(FS-S)	60	101	890	70,786	701
	160	271	2,060	161,207	595
	316	527	3,660	290,114	550
Northern Great Plains					
BLM privileges only					
(BLM-Y)(FS-0)	50	64	1,838	48,508	758
	138	181	5,447	108,882	602
	430	564	17,910	320,749	569

-Continued

Northwest Area					
FS privileges only					
(BLM-O)(FS-S)	53	65	1,114	63,599	978
	138	180	3,434	107,487	597
	296	451	5,861	265,338	588
BLM privileges only					
(BLM-Sp,F)(FS-O)	50	61	720	44,573	731
	143	181	2,610	110,757	612
	418	592	10,530	338,515	572
BLM & FS privileges					
(BLM-Sp,F)(FS-S)	57	73	639	55,218	756
	151	185	1,523	103,252	558
	377	522	4,998	285,001	546
Southern Desert Area					
BLM privileges only					
(BLM-Y)(FS-O)	55	68	1,890	44,582	656
	136	182	4,345	88,038	484
	312	423	10,677	206,702	489
Southern Intermountain Area					
FS privileges only					
(BLM-O)(FS-S)	25	35	115	21,280	608
	85	125	1,545	71,400	571
(BLM-O)(FS-Y)	80	118	620	46,200	392
	165	240	650	73,517	306
	340	512	1,975	131,327	256
BLM privileges only					
(BLM-Y)(FS-O)	28	33	931	25,682	778
	196	260	8,462	151,009	581
	352	494	20,182	331,749	672
BLM & FS privileges					
(BLM-F,W,Sp)(FS-S)	25	33	271	24,308	737
	160	206	2,677	93,838	456
	242	337	3,604	145,241	431
Southwest Desert Area					
BLM privileges only					
(BLM-Y)(FS-O)	106	170	4,920	97,113	571
	159	250	7,280	142,681	571
	289	450	13,100	263,131	585
	465	725	27,020	422,385	583
[illegible]	140	200	6,080	183,029	915
	320	450	13,440	386,962	860
	460	700	20,640	609,557	871
	856	1,300	38,400	1,122,979	864
(BLM-F,W,Sp)(FS-O)	8/	1,495	52,000	1,026,340	687

See footnotes on next page.

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1/ BLM = Bureau of Land Management, FS = Forest Service, Sp = Spring, S = Summer, F = Fall, W = Winter, Y = yearlong, 0 = none.

2/ Number of cows and replacement heifers in breeding herd on January 1, Cows 2 years old and over and replacement heifers approximately 1½ - 2 years old.

3/ Based on annual feed requirements for the ranch. Total AUM's of feed required for a year, divided by 12 months = average animal-unit-equivalents on the ranch.

4/ Land owned or leased from the state, individuals, etc. Does not include leased from BLM or FS.

5/ Includes investment in owned land, livestock, buildings and improvements, and machinery and equipment.

6/ "BLM" and "FS" are substituted for the full names of the Bureau of Land Management and Forest Service.

7/ Ranch using "Section 15" lands, lands outside organized grazing districts.

8/ Basic cow herd of 150 cows plus a stocker steer herd.

range vary from 14 to 22 percent. In contrast, ranches in the Southern Intermountain area with yearlong permits on National Forest ranges have only about 3 to 6 acres of land in base units per animal unit and around 90 percent of the total feed required is obtained from forest lands. Between these extremes are ranches in the Northwest with spring-fall permits on Bureau of Land Management ranges and National Forest summer permits. These ranches have from 6.5 to 8.8 acres per animal unit and obtain from 26 to 38 percent of total feed requirement from Federal lands.

Sheep Ranches

Owned and leased lands used in conjunction with the grazing of sheep on National Forest and Bureau of Land Management ranges are composed of rangeland, hayland, cropland, and pasture. Compared with the acreage in base units, rangeland is of greater significance on sheep ranches. In the Southern Intermountain area, where sheep are grazed on the range yearlong, for example, ranch units usually contain little or no hay or cropland. In other areas, however, where heavy winter feeding is necessary, crop and hayland may provide a significant proportion of the total feed requirements.

The amount of owned and leased land per animal unit varies from about 15 acres on sheep ranches in the Northwest area to almost 50 acres in the Southern Intermountain area. In these areas ranches obtain relatively large proportions of total feed from Federal lands, varying from around 30 percent in the Northwest area up to about 60 percent in the Intermountain and Southern Intermountain area. In the Northern Great Plains and Intermountain areas the base property per animal unit averages about 30 acres. In the Northern Great Plains, ranches do not have National Forest permits and, although yearlong grazing is permitted on

Bureau of Land Management ranges, the total amount of Federal range use is not large compared to overall feed requirements. In this area, sheep operators obtain from 17 to 20 percent of the total feed required to carry animals for a year.

Investment in Land, Livestock and Buildings and Equipment

Cattle Ranches

Total investment for the budgeted operations ranged from over a million dollars for some of the budgeted large ranches down to $21,000 for a 35-animal-unit ranch with a seasonal grazing permit in the Southern Intermountain area (table 3). The average investment for the 62 cattle ranches that were budgeted was $195,498. Total investment was consistently higher in the areas in which extensive winter feeding requires haylands and in the areas in which a cropping program is carried on in conjunction with the livestock enterprise. The investment also varied in relation to the animal unit months and season of the grazing permit, the amount of land available for lease, the yield of crop and hayland, and the grazing capacity of owned rangeland.

Investment decreases from the northern part of the western region to the southern part except in the Southwest Desert areas where high land values offset the reduced needs for equipment and buildings. A contributing factor to the lower investment in the southern tier of the Western States is the fact that little hay is raised. These ranches have a limited amount of pasture and cropland, and although supplements are fed during the periods of inadequate forage, the livestock are grazed yearlong.

Total investment per animal unit for the 62 cattle ranches that were budgeted averaged $597. It decreased with the size of operations from $689 for the smallest ranches to $525 for the largest ranches.

Many ranchers did not have as much invested in land, buildings, and equipment as is indicated by the average market value shown in table 3, but the market value of the ranch represents an opportunity for capital investment. Also, some ranches were mortgaged which involved the payment of principal and interest. But the number of such situations was not determined, hence the assumption of full ownership. Interest on investment was not included as a cost. Investment values were used only to derive the rate of return on investment.

Sheep Ranches

Investment for range sheep production in the Western States varied with size of operation and ranching area. Total investment ranged from $15,000 for the small New Mexico sheep ranches in the Southern Intermountain area to over $700,000 for the largest sheep operations. The average investment for the 14 sheep ranches budgeted was $274,337 (table 4). In general, total investment in land, buildings, improvements, and equipment per animal unit decreased with size of operation. Investment in livestock per animal unit was comparable within each ranching area regardless of the size of operation, but investment per animal unit did differ somewhat between areas because of differences in the composition of the livestock herds and the quality of the animals in the herd.

The highest investment per animal unit for the sheep ranches budgeted was $643 for a 220-animal-unit ranch in the Northwest area. The lowest investment per animal unit was $324 for a 1,714-animal-unit operation in Wyoming. Except for the Southern Intermountain area, the average total investment per animal unit was $565 for smaller ranches in the 220 to 258 animal unit size classes, $475 for ranches which had from 320 to

Table 4.- Sheep ranches: Size of ranch and total investment

Ranching area and type of ranch 1/	Size of ranch			Total investment 5/	
	Ewes 2/	Average equivalent 3/	Land owned and leased 4/	Per ranch	Per A.U.
	Number	Number	Acres	Dollars	Dollars
Intermountain Area					
BLM & FS privileges					
(BLM-F,W,Sp)(FS-S)6/	1,200	320	6,100	153,601	480
	2,660	717	20,440	329,140	459
(BLM-F,W,Sp)(FS-S) 7/	946	258	6,055	125,617	487
	2,500	677	15,985	252,739	373
	5,496	1,714	48,382	589,470	344
	6,700	2,148	70,087	743,353	346
	2,844	886	30,443	318,971	360
	5,496	1,714	66,057	555,645	324
Northern Great Plains Area					
BLM privileges only					
(BLM-Y)(FS-0)	686	229	6,366	128,664	562
	1,497	482	12,489	250,637	520
Northwest Area					
BLM & FS privileges					
(BLM-Sp,F)(FS-S)	800	220	3,293	141,290	642
	1,375	396	6,021	205,419	519
Southern Intermountain Area					
BLM privileges only					
(BLM-Y)(FS-0)	101	27	1,344	15,185	562
	302	73	3,520	30,992	425

1/ BLM = Bureau of Land Management, FS = Forest Service, Sp = Spring, S = Summer, F = Fall, W = Winter, Y = yearlong, 0 = none.

2/ Number of ewes and replacement ewes in the breeding herd on Jan. 1. Ewes 2 years old and over and replacement ewes approximately 1½ - 2 yrs. old.

3/ Based on annual feed requirements for the ranch. Total AUM's of feed required for a year, divided by 12 months = average animal-unit equivalents on the ranch.

4/ Land owned or leased from the State, individuals, etc. Does not include land leased from BLM or FS.

5/ Includes investment in owned land, livestock, buildings and improvements, and machinery and equipment.

6/ Utah. 7/ Wyoming.

677 animal units in the livestock herd, and about $400 per animal unit for the largest operations. The Southern Intermountain sheep ranches that were budgeted were the small operations in northern New Mexico. These ranches had a lower investment per animal unit than somewhat larger ranch units in other areas because of the type, weight, and quality of the sheep.

Production Per Animal Unit, Cattle and Sheep Ranches

The net income of a livestock operation is closely associated with the net production per animal unit. Production per animal unit is related to the feeding program, including the amount fed per animal unit and the quality and quantity of range and pasture forage, and to kind of livestock kept, calving percentages, culling practices, and the time of marketing. Turnoff of livestock is also related to the genetic quality of each animal.

The production rates on ranches in different ranching areas and of different ranch types are shown in tables 5 and 6. The lowest rates of production were in the Southern Desert, the Southwest Desert, and in the portions of the Intermountain, Southern Intermountain, and the California areas that are arid or semi-arid.

Costs, Income, and Rate of Return on Investment on Cattle Ranches

Costs

Total costs, cash costs, depreciation, and operator and family labor for the cattle ranches budgeted ranged from a high of $480,024 for a 1,495 animal unit ranch in the Southwest Desert to a low of $3,870 for a 33 animal unit operation in the Southern Intermountain area (table 5).

Table 5.- Cattle ranches: Production of beef cattle, average prices received, income, and expenses

Item	Unit	Ranch Area and Type 1/								
		California Area								
		(BLM-0) (FS-S)				(BLM-SpS)(FS-0) 2/		(BLM-SpSF)(FS-0) 2/		
Ranch size 4/	A.U.	69	120	235	420	76	277	101	177	323
Beef production 5/										
Per ranch	Cwt.	264	460	939	1,709	247	756	267	503	1,156
Per Animal Unit	Lbs.	383	383	400	407	325	273	264	284	358
Average prices received 6/	Dols.	18.44	18.39	17.93	17.95	19.89	19.31	18.85	18.12	18.37
Total ranch income 7/	do.	4,870	8,457	16,834	30,683	4,913	14,601	5,034	9,115	21,232
Expenses 8/										
Cash costs 9/	do.	3,794	5,846	11,331	21,573	3,917	11,618	3,100	7,740	10,946
Depreciation 10/	do.	1,577	2,148	3,090	4,729	1,464	2,652	1,178	2,775	5,299
Family labor 11/	do.	3,135	3,705	3,420	3,420	1,710	3,420	2,565	3,420	3,420
Income net of:										
Cash costs	do.	1,076	2,611	5,503	9,110	996	2,983	1,934	1,375	10,286
Cash costs and depreciation	do.	- 501	463	2,413	4,381	- 468	331	756	-1,400	4,987
Cash costs, dept., and family labor	do.	-3,636	-3,242	-1,007	961	-2,178	-3,089	-1,809	-4,820	1,567
Rate of return on investment 12/	Pct.	- 7.01	- 4.12	- 0.67	0.43	- 2.85	- 2.12	- 3.24	- 3.67	0.95

See footnotes at end of table.

-Continued

Table 5.- Cattle ranches: Production of beef cattle, average prices received, income, and expenses- Continued

Item	Unit	Ranch area and type 1/							
		Intermountain Area							
		(BLM-S)(FS-0)					(BLM-SpF)(FS-S)		
Ranch size 4/	A.U.	122	321	557	881	1,960	104	263	650
Beef production 5/									
Per ranch	Cwt.	333	981	1,586	2,745	5,396	281	804	1,911
Per Animal Unit	Lbs.	273	306	285	312	275	270	306	294
Average prices received 6/	Dols.	17.58	18.71	18.12	18.15	18.49	18.31	18.32	18.19
Total ranch income 7/	do.	5,848	18,351	28,747	49,810	99,761	5,159	15,545	34,761
Expenses 8/									
Cash costs 9/	do.	4,168	9,463	14,787	26,791	61,094	4,039	7,953	16,867
Depreciation 10/	do.	2,206	4,276	5,465	7,193	15,960	2,283	3,523	6,135
Family labor 11/	do.	3,420	3,420	3,420	3,420	3,420	3,420	3,420	3,420
Income net of:									
Cash costs	do.	1,680	8,888	13,960	23,019	38,668	1,120	7,592	17,894
Cash costs and depreciation	do.	- 526	4,612	8,495	15,826	22,708	-1,163	4,069	11,759
Cash costs, depr., and family labor	do.	-3,946	1,192	5,075	12,406	19,288	-4,583	649	8,339
Rate of return on investment 12/	Pct.	- 5.05	0.07	1.68	3.54	2.05	-7.05	0.41	3.38

See footnotes at end of table.

-Continued

Table 5.- Cattle ranches: Production of beef cattle, average prices received, income, and expenses - Continued

Item	Unit	Ranch Area and Type 1/								
		Intermountain Area - continued								
		(BLM-SpSF)(FS-0)			(BLM-SpSFW)(FS-0)			(BLM-FWSp)(FS-S)		
Ranch size 4/------------	A.U.	72	233	694	77	264	600	87	236	466
Beef production 5/										
Per ranch---------------	Cwt.	232	701	2,251	179	585	1,242	208	615	1,162
Per Animal Unit---------	Lbs.	322	301	324	232	222	207	239	261	249
Average prices received 6/	Dols.	17.50	16.89	16.84	16.16	16.50	16.58	16.49	16.66	17.13
Ttoal ranch income 7/----	do.	6,612	14,421	37,908	3,541	10,055	20,833	5,019	11,768	23,695
Expenses 8/										
Cash costs 9/-----------	do.	3,081	8,316	20,113	2,864	5,968	15,289	3,618	6,737	14,643
Depreciation 10/--------	do.	1,543	3,258	7,027	1,648	2,733	4,522	1,536	2,868	4,089
Family labor 11/--------	do.	2,428	5,603	3,735	3,601	6,640	4,358	3,800	4,950	6,200
Income net of:										
Cash costs--------------	do.	3,531	6,105	17,795	677	4,087	5,544	1,401	5,031	9,052
Cash costs and depreciation --------------	do.	1,988	2,847	10,768	- 971	1,354	1,022	- 135	2,163	4,963
Cash costs, depr., and family labor-----------	do.	- 440	-2,756	7,033	-4,572	-5,286	-3,336	-3,935	-2,787	-1,237
Rate of return on investment 12/ -----------	Pct.	- 0.90	- 2.46	2.59	- 9.23	- 4.60	- 1.47	-6.55	- 2.25	- 0.54

See footnotes at end of table.

-Continued

Table 5.- Cattle ranches: Production of beef cattle, average prices received, income, and expenses - Continued

Item	Unit	Ranch Area and Type 1/							
		Mountain Area					Northern Great Plains Area		
		(BLM-C)(FS-S)		(BLM-Sp)(FS-S)			(BLM-SpSFW)(FS-0)		
Ranch size 4/	A.U.	95	240	101	271	527	64	181	564
Beef production 5/									
Per ranch	Cwt.	281	644	341	891	1,678	219	636	1,997
Per animal unit	Lbs.	296	268	338	329	318	342	351	354
Average prices received 6/	Dols.	15.59	16.54	16.38	16.42	16.17	17.98	17.64	17.55
Total ranch income 7/	do.	6,535	16,182	5,586	14,634	27,134	7,326	13,367	37,034
Expenses 8/									
Cash costs 9/	do.	4,909	9,722	3,198	7,900	16,294	2,918	5,799	18,873
Depreciation 10/	do.	1,498	2,340	1,451	3,276	4,619	1,478	2,401	5,734
Family labor 11/	do.	2,100	3,850	3,180	3,960	4,680	1,800	1,800	1,800
Income net of:									
Cash costs	do.	1,626	6,460	2,388	6,734	10,840	4,408	7,568	18,161
Cash costs and depreciation	do.	128	4,120	937	3,458	6,221	2,930	5,167	12,427
Cash costs, dept., and family labor	do.	-1,972	270	2,243	- 502	1,541	1,130	3,367	10,627
Rate of return on investment 12/	Pct.	- 2.65	0.19	- 3.17	- 0.31	0.53	2.33	3.09	3.31

See footnotes at end of table

-Continued

Table 5.- Cattle ranches: Production of beef cattle, average prices received, income, and expenses - Continued

Item	Unit	Ranch Area and Type 1/								
		Northwest Area								
		(BLM-0)(FS-S)			(BLM-SpF)(FS-0)			(BLM-SpF)(FS-S)		
Ranch size 4/	A.U.	65	180	451	61	181	592	73	185	522
Beef production 5/										
Per ranch	Cwt.	281	748	1,867	223	693	2,272	293	704	1,982
Per Animal Unit	Lbs.	432	416	414	366	383	384	401	380	380
Average prices received 6/	Dols.	16.63	16.68	16.94	16.74	16.70	16.56	16.73	16.81	16.84
Total ranch income 7/	do.	9,004	12,637	35,090	4,810	11,845	38,521	7,921	13,941	33,962
Expenses 8/										
Cash costs 9/	do.	3,261	6,338	18,620	3,088	6,353	23,597	3,337	6,478	21,878
Depreciation 10/	do.	1,366	2,192	3,852	1,261	2,263	4,459	1,122	2,059	3,720
Family labor 11/	do.	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Income net of:										
Cash costs	do.	5,743	6,299	16,470	1,722	5,492	14,924	4,584	7,463	12,084
Cash costs and depreciation	do.	4,377	4,107	12,618	461	3,229	10,465	3,462	5,404	8,364
Cash costs, depr., and family labor	do.	1,977	1,707	10,218	-1,939	829	8,065	1,062	3,004	5,964
Rate of return on investment 12/	Pct.	3.12	1.59	3.85	- 4.35	0.75	2.38	1.92	2.91	2.09

See footnotes at end of table.

- Continued

Table 5.- Cattle ranches: Production of beef cattle, average prices received, income, and expenses- Continued

Item	Unit	Ranch Area and Type 1/							
		Southern Desert Area			Southern Intermountain				
		(BLM-SpSFW)(FS-O)			(BLM-O)(FS-S)		(BLM-O)(FS-SpSFW)		
Ranch size 4/	A.U.	68	182	423	35	125	118	240	512
Beef production 5/									
Per ranch	Cwt.	173	497	1,174	100	391	345	766	1,516
Per Animal Unit	Lbs.	254	273	277	286	313	292	319	296
Average prices received 6/	Dols.	19.00	19.75	18.05	20.14	19.30	19.68	19.14	19.41
Total ranch income 7/	do.	3,288	9,809	21,193	2,014	7,546	6,790	14,663	29,431
Expenses 8/									
Cash costs 9/	do.	2,469	4,947	12,151	1,447	4,942	5,079	8,752	17,406
Depreciation 10/	do.	2,103	3,147	5,802	885	1,659	1,546	2,365	3,994
Family labor 11/	do.	1,488	2,232	2,232	2,628	2,628	2,628	2,628	2,628
Income net of:									
Cash costs	do.	819	4,862	9,042	567	2,604	1,711	5,911	12,025
Cash costs and depreciation	do.	-1,284	1,715	3,240	- 318	945	165	3,546	8,031
Cash costs, depr., and family labor	do.	-2,772	- 517	1,008	-2,946	-1,683	-2,463	918	5,403
Rate of return on investment 12/	Pct.	- 6.22	- 0.59	0.49	-13.84	- 2.36	- 5.33	1.25	4.11

See footnotes at end of table.

- Continued

Table 5.- Cattle ranches: Production of beef cattle, average prices received, income, and expenses - Cont.

Item	Unit	Ranch Area and Type 1/					
		Southern Intermountain Area - continued					
		(BLM-SpSFW) (FS-O) 2/			(BLM-FWSp)(FS-S)		
Ranch size 4/	A.U.	33	260	494	33	206	337
Beef production 5/							
Per ranch	Cwt.	100	723	1,362	99	608	1,021
Per Animal Unit	Lbs.	303	278	276	300	295	303
Average prices received 6/	Dols.	18.88	18.65	20.54	18.70	19.67	18.69
Total ranch income 7/	do.	1,888	13,483	28,256	1,851	11,965	19,087
Expenses 8/							
Cash costs 9/	do.	1,529	6,723	13,544	1,437	5,687	9,601
Depreciation 10/	do.	1,225	4,010	7,730	1,431	4,012	6,214
Family labor 11/	do.	1,116	2,232	2,232	1,116	2,232	2,232
Income net of:							
Cash costs	do.	359	6,760	14,712	414	6,278	9,486
Cash costs and depreciation	do.	- 866	2,750	6,982	-1,017	2,266	3,272
Cash costs, depr., and family labor	do.	-1,982	518	4,750	-2,133	34	1,040
Rate of return on investment 12/	Pct.	- 7.72	0.34	1.43	- 8.77	0.04	0.72

See footnotes at end of table.

-Continued

Table 5.- Cattle ranches: Production of beef cattle, average prices received, income, and expenses - cont.

Item	Unit	Ranch Area and Type 1/								
		Southwest Desert Area								
		(BLM-SpSFW)(FS-0) 3/				(BLM-SpSFW)(FS-0) 2/				(BLM-FWSp) (FS-0) 3/
Ranch size 4/	A.U.	170	250	450	725	200	450	700	1,300	1,495
Beef production 5/										
Per ranch	Cwt.	401	615	1,095	1,788	488	1,093	1,718	3,212	6,350
Per Animal Unit	Lbs.	236	246	243	247	244	243	245	247	425
Average prices received 6/	Dols.	16.24	16.23	16.29	16.22	16.89	17.02	16.31	16.29	20.31
Total ranch income 7/	do.	6,839	10,307	18,164	29,321	8,569	18,929	28,344	52,660	521,530
Expenses 8/										
Cash costs 9/	do.	3,949	5,035	11,129	18,698	4,047	9,975	13,998	27,563	479,347
Depreciation 10/	do.	598	1,147	1,998	3,034	1,179	1,943	3,591	6,042	677
Family labor 11/	do.	2,500	5,000	5,000	2,500	5,000	5,000	5,000	5,000	0
Income net of:										
Cash Costs	do.	2,890	5,272	7,035	10,623	4,522	8,954	14,346	25,097	42,183
Cash costs and depreciation	do.	2,292	4,125	5,037	7,589	3,343	7,011	10,755	19,055	41,506
Cash costs, depr., and family labor	do.	- 208	- 875	37	5,089	-1,657	2,011	5,755	14,055	41,506
Rate of return on investment 12/	Pct.	- 0.21	-0.61	0.01	1.20	- 0.90	0.52	0.94	1.25	4.04

1/ BLM = Bureau of Land Management, FS = Forest Service, Sp = Spring, S = Summer, F = Fall, W = Winter, Y = yearlong, 0 = none.

2/ Ranches using "Section 15" lands outside of organized BLM districts.

3/ Ranches purchase and run stocker steers in addition to the basic cow herd.

4/ Based on annual feed requirements for the ranch. Total AUM's of feed required for a year, divided by 12 months = average animal unit equivalents on the ranch.

5/ Total liveweight produced and sold. All classes of cattle included.

6/ Average projected prices for all classes of beef produced and sold.

7/ Income at projected prices for livestock and crops. Total includes government payments.

8/ Expenses at 1960 levels of prices paid by ranchers.

9/ Cash costs include purchased feeds, hired labor, grazing fees, repairs, interest on operating capital, etc.

10/ Depreciation is a non-cash cost. Included are depreciation and death loss on bulls.

11/ Family labor includes operator labor.

12/ Ranch income net of cash costs, depreciation, and family labor as a percentage of average investment in the ranch.

Table 6.- Sheep Ranches: Production of sheep and lambs and wool, prices received, income, expenses and rate of return on investment

Item	Unit	Ranching Area and ranch type 1/							
		Intermountain Area							
		(BLM-F,W,Sp) (FS-S) 2/		(BLM-F,W,Sp)(FS-S) 3/					
Ranch size 4/	A.U.	320	717	258	677	1,714	2,148	886	1,714
Annual sheep and lamb production 5/	Cwt.	1,009	1,962	717	1,637	3,463	4,085	1,685	2,846
Sheep & lambs per A.U.	Pounds	315	274	278	242	202	190	190	166
Annual wool production	Cwt.	138	305	128	338	856	1,072	442	856
Wool per animal unit	Pounds	43	43	49	50	50	50	50	50
Average prices received for sheep & lambs 6/	Dol./Cwt.	14.35	14.90	15.45	15.45	15.45	15.45	15.45	15.45
Av. prices rec. for wool 7/	Dol./Cwt.	42.00	42.00	39.20	40.20	40.90	40.90	39.20	40.40
Gross ranch income 8/	Dollars	24,253	48,960	20,751	48,920	112,454	136,376	55,040	101,268
Cash costs 9/	do.	13,048	32,844	13,388	33,494	81,841	98,857	43,879	83,158
Depreciation 10/	do.	4,374	3,635	4,212	7,643	10,038	11,889	5,244	9,115
Operator and family labor	do.	6,775	5,100	4,460	5,490	6,305	6,305	5,490	6,305
Ranch income net of:									
Cash costs	do.	11,205	16,116	7,363	15,426	30,613	37,519	11,161	18,110
Cash cost and depre.	do.	6,831	12,481	3,151	7,783	20,575	25,630	5,917	8,995
Cash costs, depre., and operator & fam. labor	do.	56	7,381	-1,309	2,293	14,270	19,325	427	2,690
Rate of return on investment 11/	Percent	0.04	2.25	-1.04	0.91	2.42	2.60	0.13	0.48

See footnotes at end of table.

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Table 6.- Sheep Ranches: Production of sheep and lambs and wool, prices received, income, expenses and rate of return on investment

Item	Unit	Ranching Area and ranch type 1/					
		Northern Great Plains Area		Northwest Area		Southern Inter-mountain Area	
		(BLM-Y)	(FS-0)	(BLM-Sp,S,F)	(FS-S)	(BLM-Y)	(FS-0)
Ranch size 4/	A. U.	229	482	220	396	27	73
Annual sheep and lamb production 5/	Cwt.	666	1,341	760	1,518	48	171
Sheep and lambs per A. U.	Pounds	291	278	345	383	178	234
Annual wool production	Cwt.	102	222	115	209	8	23
Wool per animal unit	Pounds	45	46	52	53	28	31
Average prices rec. for sheep and lambs 6/	Dol./Cwt.	13.26	13.02	15.11	14.82	16.92	16.92
Average prices received for wool 7/	do.	42.00	42.00	42.00	42.00	30.00	30.00
Gross ranch income 8/	Dollars	16,914	33,834	21,125	36,021	1,429	4,141
Cash costs 9/	do.	10,010	18,653	12,001	25,028	730	2,886
Depreciation 10/	do.	4,471	6,531	2,715	4,604	416	1,378
Operator and family labor	do.	2,552	3,500	3,600	2,400	1,584	1,584
Ranch income net of:							
Cash costs	do.	6,904	15,181	9,124	10,993	699	1,255
Cash costs and depreciation	do.	2,433	8,650	6,409	6,389	283	- 123
Cash costs, depreciation, and operator and family labor	do.	- 119	5,150	2,809	3,989	-1,301	-1,707
Rate of return on investment 11/	Percent	-0.92	2.05	2.25	1.99	-8.57	-5.51

1/ BLM = Bureau of Land Management, FS = Forest Service, Sp= Spring, F = Fall, W = Winter, Y = Sp, S,F, and W, 0 = None. 2/ Utah. 3/ Wyoming. 4/ Based on Annual feed requirements for the ranch. Total AUM's of feed required for a year, divided by 12 mos. = Average A.U. equivalents on the ranch. 5/ Total sheep and lambs produced and sold. All classes of sheep included. 6/ Average price per hundredweight of all sheep and lambs produced and sold at projected prices. 7/ Average price per hundredweight for wool produced and sold at projected prices. 8/ Gross income at projected prices for livestock and wool, includes incentive payments and crop sales. 9/ Cash costs include: purchased feeds, hired labor, grazing fees, repairs, interest on operating capital, etc. 10/ Depreciation is a non-cash cost. Included are depreciation and death loss on rams. 11/ Ranch income, net cash costs, depreciation, and operator and family labor as a percentage of the average long-run investment in the ranch.

Costs per animal unit were similar for ranches of approximately the same size regardless of the area in which they were located. But cost per animal unit decreased as the size of the ranch in animal unit equivalents increased. Costs per animal unit for ranches with less than 150 animal units ranged from a low of $41 per animal unit in the Southwest Desert area to a high of $117 in the Southern Intermountain area. Ranches with 151 to 250 animal units had an average cost of from $51 to $79 per animal unit and ranches of 251 to 400 animal units in size had an average cost of from $49 to $64 per animal unit. The 401 to 650 animal unit ranches had an average cost per animal unit of from $40 in California to $70 in the same area. Ranches in the over 650 animal unit size had an average cost of from $33 per animal unit in the Southwest Desert to $41 in the California area (table 7).

The total amount of cash costs was not consistent among ranch types or among ranching areas. Average cash costs per animal unit ranged from a low of $20 for a 200-animal-unit ranch in the Southwest Desert area to a high of $55 on a 69-animal-unit ranch in California. Area differences in the costs of materials and services, such as wage rates, taxes, and equipment items influence area costs considerably. In Montana, for instance, as compared with California, these costs are much lower.

Income

Three measures of ranch income were computed: (a) Income net of cash costs, which is the cash on hand after all cash operating expenses are paid. It is the income available for family living and investment. More specifically, it is the income left to cover depreciation, interest

Table 7 .- Cattle Ranches: total costs of operation per animal unit, by ranching area and type and size of ranch, Western Region

Ranching area and type of ranch	Animal units per ranch: Less than 150	151-250	251-400	401-650	Over 650
	Dollars	Dollars	Dollars	Dollars	Dollars
California Area					
FS privileges only					
(BLM-O) (FS-S)	110	75	--	70	--
BLM privileges only					
(BLM-S)(FS-0)	80	--	53	42	41
(BLM-Sp,S)(FS-0)	93	--	64	--	--
(BLM-Sp,S,F)(FS-0)	68	79	60	--	--
BLM & FS privileges					
(BLM-Sp,F)(FS-S)	94	--	50	40	--
Intermountain Area					
BLM privileges only					
(BLM-Sp,S,F)(FS-0)	98	74	--	44	--
(BLM-Sp,S,F,W)(FS-0)	105	--	58	40	--
BLM & FS privileges					
(BLM-F,W,Sp)(FS-S)	104	61	--	53	--
Mountain Area					
FS privileges only					
(BLM-0)(FS-S)	90	66	--	--	--
BLM & FS privileges					
(BLM-Sp,F)(FS-S)	77	--	56	49	--
Northern Great Plains Area					
BLM privileges only					
(BLM-Y)(FS-0)	97	55	--	40	--
Northwest Area					
FS privileges only					
(BLM-0)(FS-S)	108	60	--	54	--
BLM privileges only					
(BLM-Sp,F)(FS-0)	111	60	--	52	--
BLM & FS privileges					
(BLM-Sp,F)(FS-0)	94	59	--	53	--
Southern Desert Area					
BLM privileges only					
(BLM-Y)(FS-0)	89	56	--	48	--
Southern Intermountain Area					
FS privileges only					
(BLM-0)FS-S)	107	--	--	--	--
(BLM-0)FS-Y)	78	57	--	47	--
BLM privileges only					
(BLM-Y)(FS-0)	117	--	49	47	--
BLM & FS privileges					
(BLM-F,W,Sp)(FS-S)	121	58	53	--	--
Southwest Desert Area					
BLM privileges only					
(BLM-Y)(FS-0)	41	45	--	40	33
(BLM-Y)(FS-0)	--	51	--	37	31
(BLM-F,W,Sp)(FS-0)	--	--	--	--	321

1/ The high cost was caused by purchases of stocker steers.

on investment, and operator and family labor. On a debt-free ranch these expenses are paid by the rancher to himself. If the rancher is in debt, interest and principal payments must be paid out of this income. (b) Income net of cash costs and depreciation. Although the rancher pays depreciation costs to himself, these funds cannot properly be used for family consumption. (c) Income net of cash costs, depreciation, and a charge for family labor. The rancher also pays himself and members of his family for family labor. He therefore might consider it as income rather than a cost of operation. If both depreciation and charges for family labor are not considered as costs, however, capital investment cannot be maintained, the earnings of labor are not measured, and a true rate of return on investment cannot be computed.

Income net of cash cost ranged from a high of $44,419 for the Southwest Desert stocker steer operation to a low of $359 for a 33-animal-unit ranch in the Southern Intermountain area (table 5). Income net of cash cost and depreciation was negative for almost half of the ranches of a size that was less than 150 animal units. But it was negative for only one ranch in the size group that ranged from 151 to 250 animal units. All of the ranches that were larger than 250 animal units in size had positive incomes net of cash cost and depreciation (table 8).

Income net of cash cost, depreciation, and operator and family labor was negative for all ranches of less than 150 animal units with the exception of two ranches in the Northwest area and one ranch in the Northern Great Plains. It was negative for half the ranches in the 151 to 250 animal unit size class and for almost half of the ranches in the 251 to 400 animal unit size class. It was positive for all ranches larger than 400 animal units except for two ranches in the 401 to 650 animal unit size class in the Intermountain area.

Table 8.- Cattle Ranches: Ranch income per animal unit and rate of return on investment by ranching area and type of ranch, Western Region

Ranch size and item	Unit	California area					Southwest desert area		
		(BLM-0) (FS-S)	(BLM-S) (FS-0)	(BLM-Sp, S) (FS-0)	(BLM-Sp, S, F) (FS-0)	(BLM-Sp, F) (FS-S)	(BLM-Y) (FS-0)	(BLM-Y) (FS-0)	(BLM-F, W, Sp) (FS-0)
Less than 150 a.u.									
Income net of-									
Cash costs-------	Dols.	20	14	13	19	11	---	---	---
Cash costs and depreciation----	"	-1	-4	-6	7	-11	---	---	---
Cash costs, depr. and family labor	"	-40	-32	-29	-18	-44	---	---	---
Rate of return on investment-------	Pct.	-5.59	-5.05	-2.85	-3.24	-7.05	---	---	---
151-250 animal units									
Income net of-									
Cash costs-------	Dols.	23	---	---	8	---	19	23	---
Cash costs and depreciation----	"	10	---	---	-8	---	15	17	---
Cash costs, depr. and family labor	"	-4	---	---	-27	---	-3	-8	---
Rate of return on investment-------	Pct.	-0.67	---	---	-3.67	---	-0.41	-0.90	---
251-400 animal units									
Income net of-									
Cash costs-------	Dols.	---	28	17	32	29	---	---	---
Cash costs and depreciation----	"	---	14	2	15	15	---	---	---
Cash costs, depr. and family labor	"	---	4	-17	5	2	---	---	---
Rate of return on investment-------	Pct.	---	1.24	-2.12	0.97	0.41	---	---	---

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Table 8.- Cattle Ranches: Ranch income per animal unit and rate of return on investment by ranching area and type of ranch, Western Region--continued

Ranch size and item	Unit	California area					Southwest desert area		
		(BLM-0) (FS-S)	(BLM-SO (FS-0)	(BLM-Sp, S) (FS-0)	(BLM-Sp, S, F) (FS-0)	(BLM-Sp, F) (FS-S)	(BLM-Y) (FS-0)	(BLM-Y) (FS-0)	(BLM-F, W, Sp) (FS-0)
401-650 animal units									
Income net of-									
Cash costs-------	Dols.	22	25	---	---	28	16	20	---
Cash costs and depreciation----	"	2	15	----	---	18	11	16	---
Cash costs, depr. and family labor	"	10	9	---	---	13	1	4	---
Rate of return on investment-------	Pct.	0.43	1.68	---	---	3.38	0.01	0.52	---
600 and over animal units									
Income net of-									
Cash costs-------	Dols.	---	21	---	---	---	15	20	30
Cash costs and depreciation----	"	---	14	---	---	---	10	15	28
Cash costs, depr. and family labor	"	---	12	---	---	---	7	10	28
Rate of return on investment-------	Pct.	---	2.79	---	---	---	1.20	1.09	4.04

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Table 8.- Cattle Ranches: Ranch income per animal unit and rate of return on investment by ranching area and type of ranch, Western Region--continued

Ranch size and item	Unit	Intermountain area			Mountain area		Northern Great Plains
		(BLM-Sp,S,F) (FS-0)	(BLM-Sp,S,F,W) (FS-0)	(BLM-F,W,Sp) (FS-S)	(BLM-0) (FS-S)	(BLM-Sp,F) (FS-S)	(BLM-Y) (FS-0)
Less than 150 a.u.							
Income net of-							
Cash costs	Dols	49	9	16	17	24	69
Cash costs and depreciation	"	28	-13	-2	1	9	46
Cash costs, depr. and family labor	"	-6	-59	-45	-21	-22	18
Rate of return on investment	Pct.	-0.90	-9.23	-6.51	-2.65	-3.17	2.33
150-250 a.u.							
Income net of-							
Cash costs	Dols	26	---	21	27	---	42
Cash costs and depreciation	"	12	---	9	17	---	28
Cash costs, depr. and family labor	"	-12	---	-12	1	---	19
Rate of return on investment	Pct.	-2.46	---	-2.25	0.19	---	3.09
251-400 a.u.							
Income net of-							
Cash costs	Dols	---	15	---	---	25	---
Cash costs and depreciation	"	---	5	---	---	13	---
Cash costs. depr. and family labor	"	---	-20	---	---	-2	---
Rate of return on investment	Pct.	---	-4.60	---	---	-0.31	---

-Continued

Table 8.- Cattle Ranches: Ranch income per animal unit and rate of return on investment by ranching area and type of ranch, Western Region--continued

Ranch size and item	Unit	Intermountain area			Mountain area		Northern Great Plains
		(BLM-Sp,S,F) (FS-0)	(BLM-Sp,S,F,W) (FS-0)	(BLM-F,W,Sp) (FS-S)	(BLM-0) (FS-S)	(BLM-Sp,F) (FS-S)	(BLM-Y) (FS-0)
401-650 a.u.							
Income net of-							
Cash costs-------	Dols	---	9	19	---	21	32
Cash costs and depreciation----	"	---	2	11	---	12	22
Cash costs, depr. and family labor	"	---	-6	-3	---	3	19
Rate of return on investment-------	Pct.	---	-1.47	-0.54	---	0.53	3.31
600 and over a.u.							
Income net of-							
Cash costs-------	Dols	26	---	---	---	---	---
Cash costs and depreciation----	"	15	---	---	---	---	---
Cash costs, depr. and family labor	"	10	---	---	---	---	---
Rate of return on investment-------	Pct.	2.59	---	---	---	---	---

-Continued

Table 8.- Cattle Ranches: Ranch income per animal unit and rate of return on investment by ranching area and type of ranch, Western Region--continued

Ranch size and item	Unit	Northwest area			Southern Desert	Southern Intermountain area			
		(BLM-O) (FS-S)	(BLM-Sp,F) (FS-O)	(BLM-Sp,F) (FS-S)	(BLM-Y) (FS-O)	(BLM-O) (FS-S)	(BLM-O) (FS-Y)	(BLM-Y) (FS-O)	(BLM-F,W,Sp) (FS-S)
Less than 150 a.u.									
Income net of-									
Cash costs-------	Dols.	88	28	63	12	20	14	9	13
Cash costs and depreciation----	"	67	7	47	-19	10	1	-26	-31
Cash costs, depr. and family labor	"	30	-32	14	-41	-48	-21	-60	-65
Rate of return on investment-------	Pct.	3.12	-4.35	1.92	-6.22	-8.10	-5.33	-7.72	-8.77
151-250 a.u.									
Income net of-									
Cash costs-------	Dols.	35	30	40	27	---	25	---	30
Cash costs and depreciation----	"	23	18	29	9	---	15	---	11
Cash costs, depr. and family labor	"	9	4	16	-3	---	4	---	1
Rate of return on investment-------	Pct.	1.59	0.75	2.91	-0.59	---	1.25	---	0.04
251-400 a.u.									
Income net of-									
Cash costs-------	Dols.	---	---	---	---	---	---	26	28
Cash costs and depreciation----	"	---	---	---	---	---	---	11	10
Cash costs, depr. and family labor	"	---	---	---	---	---	---	2	3
Rate of return on investment-------	Pct.	---	---	---	---	---	---	0.34	0.72

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Table 8.- Cattle Ranches: Ranch income per animal unit and rate of return on investment by ranching area and type of ranch, Western Region--continued

Ranch size and item	Unit	Northwest area			Southern Desert	Southern Intermountain area			
		(BLM-O) (FS-S)	(BLM-Sp,F) (FS-O)	(BLM-Sp,F) (FS-S)	(BLM-Y) (FS-O)	(BLM-O) (FS-S)	(BLM-O) (FS-Y)	(BLM-Y) (FS-O)	(BLM-F,W,Sp) (FS-S)
401-650 a.u.									
Income net of-									
Cash costs-------	Dols.	36	25	23	21	---	23	30	---
Cash costs and depreciation----	"	28	18	16	8	---	16	14	---
Cash costs, depr. and family labor	"	23	14	11	2	---	10	10	---
Rate of return on investment-------	Pct.	3.85	2.38	2.09	0.49	---	4.11	1.43	---
600 and over a.u.									
Income net of-									
Cash costs-------	Dols.	---	---	---	---	---	---	---	---
Cash costs and depreciation----	"	---	---	---	---	---	---	---	---
Cash costs, depr. and family labor	"	---	---	---	---	---	---	---	---
Rate of return on investment-------	Pct.	---	---	---	---	---	---	---	---

To compare the effect on net income of livestock prices that were slightly higher than the projected prices, the average prices received for the period 1953-1960, which represented a full cattle price cycle, were used to derive a second set of net incomes for the cattle ranches in California, Intermountain, and the Southern Intermountain areas. Prices equal to the average 1953-1960 prices would increase the gross income of each ranch by four to five percent (table 9).

Rate of Return on Investment

Rate of return on investment increased slightly with size of operation. For the Western Region, only two ranches received a return to investment that was greater than 4 percent: 4.11 percent for the 512-animal-unit ranch in the Southern Intermountain area and 4.04 percent for the 1,495-animal-unit ranch in the Southwest Desert. Returns of 2 to 3 percent were quite common in each ranching area for ranches with more than 400 animal units (table 8).

Costs, Income, and Rate of Return on Investment on Sheep Ranches

Costs

Total costs ranged from a high of $117,051 for the 2,148 animal unit sheep ranch in the Intermountain area to a low of $2,730 for a 27 animal unit sheep ranch in the Southern Intermountain area (table 6). The ranch with the highest total cost per animal unit, $101, is the 27-animal-unit ranch in the Southern Intermountain area. The lowest total per animal unit cost ranch, $55, is the 2,148 animal unit ranch in the Intermountain area. Total costs per animal unit vary only slightly among ranching areas and ranch types by size of ranch; however, total

Table 9.- Cattle Ranches: Comparison of two levels of beef cattle prices and their relative effects on ranch income

Ranching area and type of ranch 1/	Size of ranch		Average price received (all beef)		Income from livestock sales			
	Cows 2/	Animal unit equivalents 3/	Projected 4/	1953-1960 5/	Projected 4/	1953-1960 5/	Difference	
	No.	No.	Dol./Cwt.	Dol./Cwt.	Dol.	Dol.	Dol.	Pct. 6/
California area								
FS privileges only 7/								
(BLM-O)(FS-S)--------	50	69	18.44	19.28	4,870	5,089	219	4.50
	85	120	18.39	19.21	8.457	8,837	380	4.49
	150	235	17.93	18.66	16,834	17,523	689	4.09
	275	420	17.95	18.70	30,683	31,952	1,269	4.14
(BLM-Sp,S)(FS-O) 8/--	49	76	19.89	20.87	4,913	5,155	242	4.93
	196	277	19.31	20.30	14,601	15,346	745	5.10
(BLM-Sp,S,F)(FS-O) 8/	74	101	18.85	19.68	5,034	5,254	220	4.37
	113	177	18.12	18.94	9,115	9,526	411	4.50
	242	323	18.37	18.78	21,232	21,713	481	2.27
Intermountain area								
BLM privileges only 7/								
(BLM-S)(FS-O)--------	72	122	17.58	18.28	5,848	6,088	240	4.10
	229	321	18.71	19.89	18,351	19,515	1,164	6.34
	374	557	18.12	18.96	28,747	30,075	1,327	4.62
	590	881	18.15	19.67	49,810	53,988	4,178	8.38
	1,187	1,960	18.49	20.16	99,762	108,796	9,034	9.06
BLM & FS privileges								
(BLM-Sp,F)(FS-S)-----	65	104	18.31	19.18	5,159	5,389	230	4.46
	175	263	18.32	19.15	14,722	15,394	672	4.56
	400	650	18.19	18.97	34,761	36,254	1,493	4.30
Southern Desert area								
BLM privileges only								
(BLM-Y) (FS-O)-------	55	68	19.00	20.02	3,288	3,464	176	5.35
	136	182	19.75	20.79	9,809	10,332	523	5.33
	312	423	18.05	19.15	21,193	22,478	1,285	6.06

-Continued

Table 9.- Cattle Ranches: Comparison of two levels of beef cattle prices and their relative effects on ranch income -Con.

Ranching area and type of ranch 1/	Size of ranch		Average price received (all beef)		Income from livestock sales			
	Cows 2/	Animal unit equivalents 3/	Projected 4/	1953-1960 5/	Projected 4/	1953-1960 5/	Difference	
	No.	No.	Dol./Cwt.	Dol./Cwt.	Dol.	Dol.	Dol.	Pct. 6/
Southern Intermountain Area								
FS privileges only								
(BLM-O)(FS-S)--------	25	35	20.14	20.61	2,014	2,061	47	2.33
	85	125	19.30	19.62	7,546	7,671	125	1.66
(BLM-O)(FS-Y)--------	80	118	19.68	19.91	6,790	6,868	78	1.15
	165	240	19.14	19.30	14,663	14,785	122	0.83
	340	512	19.41	19.64	29,431	29,770	339	1.15
BLM privileges only								
(BLM-Y)(FS-O)--------	28	33	18.88	19.35	1,888	1,935	47	2.49
	196	260	18.65	19.62	13,483	14,114	631	4.68
	352	494	20.54	21.80	28,256	29,697	1,441	5.10
(BLM-F,W,Sp)(FS-S)---	25	33	18.70	19.66	1,851	1,946	95	5.13
	160	206	19.67	20.72	11,965	12,605	640	5.35
	242	337	18.69	19.66	19,087	20,075	988	5.14

1/ Type of ranch defined by pattern of use of public ranges: Sp=spring, S=summer, F=fall, W=winter, Y=yearlong, O=none.

2/ Number of cows and replacement heifers in the breeding herd on January 1. Cows 2 years old and over and replacement heifers approximately 1½ - 2 years old.

3/ Based on annual feed requirements for the ranch. Total AUM's of feed required for a year, divided by 12 months = average animal-unit equivalents on the ranch.

4/ At projected long term prices for beef cattle.

5/ At average beef cattle price 1953-1960.

6/ Difference as a percentage increase over income at projected prices.

7/ "BLM" and "FS" are substituted for the full names of the Bureau of Land Management and the Forest Service.

8/ Ranches using "Section 15 lands," outside organized grazing districts.

costs per animal unit decrease as size of the operation increases in a fashion that is similar to the behavior of total cost per animal unit of the cattle ranches (table 10).

Although total costs per animal unit were approximately the same for ranches of different sizes, the composition of the costs varied by ranch type and ranching areas. For example, the total cost of operator and family labor used by Southern Intermountain sheep ranches was less than for any of the other sheep ranches (table 6). On an animal unit basis, however, these ranches had the highest operator and family labor cost, principally due to the small size of Southern Intermountain sheep operations. Average cost for operator and family labor was $8 an animal unit for the 677 animal unit ranch in the Intermountain area and $3 per animal unit for the 2,148 animal unit Intermountain sheep ranch.

Depreciation costs did not vary much among ranches of the same size class regardless of location, but they did change considerably per animal unit as the number of animal units in the operation increased. Increases in the investment required do not change proportionately with increases in the number of animal units for the sheep ranches budgeted.

Cash costs averaged about $48 per animal unit in the Intermountain area, about $42 in the Northern Great Plains, about $59 in the Northwest, and about $34 per animal unit in the Southern Intermountain ranching area. The higher cash costs for the northern sheep operations was due, to a large extent, to higher costs for hired labor and to greater feed costs.

Income

The same measures of net income that were used for cattle ranches were also used to measure the profitability of sheep operations: gross

Table 10.- Sheep Ranches: Ranch income net of cash cost, depreciation and operator and family labor, and rate of return on investment per animal unit 1/, by ranching area, Western Region

Ranching area and type of ranch 2/	Ewes	AU equivalent 3/	Total cost per animal unit				Ranch income net of cash costs Size range in animal units			
			27-73	220-258	320-677	717-2148	27-73	220-258	320-677	717-2148
	Number	Number	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Intermountain Area:										
BLM & FS privileges										
(BLM,W,Sp)(FS-S) 4/....	1,200	320	---	---	76	---	---	---	35	---
	2,660	717	---	---	---	58	---	---	---	22
(BLM,W,Sp)(FS-S) 5/....	946	253	---	85	---	---	---	28	---	---
	2,500	677	---	---	68	---	---	---	23	---
	2,844	866	---	---	---	62	---	---	---	12
	5,496	1,714	---	---	---	58	---	---	---	18
	5,496	1,714	---	---	---	58	---	---	---	11
	6,700	2,148	---	---	---	55	---	---	---	17
Northern Great Plains Area:										
BLM privileges only										
(BLM-Y)(FS-O)..........	686	229	---	75	---	---	---	30	---	---
	1,497	402	---	---	60	---	---	---	31	---
Northwest Area:										
BLM & FS privileges										
(BLM-Sp,S,F,)(FS-S)....	800	220	---	83	---	---	---	41	---	---
	1,375	396	---	---	81	---	---	---	28	---
Southern Intermountain Area:										
BLM privileges only										
(BLM-Y)(FS-O)..........	101	27	101	---	---	---	26	---	---	---
	302	73	81	---	---	---	17	---	---	---

- Continued -

Table 10.- Sheep Ranches: Ranch income net of cash cost, depreciation and operator and family labor, and rage of return on investment per animal unit 1/, by ranching area, Western Region - Continued

Ranching area and type of ranch 2/	Ranch income net of cash cost and depreciation				Ranch income net of cash cost depreciation and operator and family labor				Rate of return on investment			
	Size range in animal units											
	27-73	220-258	320-677	717-2148	27-73	220-258	320-677	717-2148	27-73	220-258	320-677	717-2148
	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Dols.	Per.	Per.	Per.	Per.
Intermountain Area:												
BLM & FS privileges												
(BLM,W,Sp)(FS-S)4/.....	---	---	21	---	---	---	.13	---	---	---	.04	---
	---	---	---	17	---	---	---	10	---	---	---	2.24
(BLM,W,Sp)(FS-S)5/.....	---	12	---	---	---	-5	---	---	---	-1.04	---	---
	---	---	11	---	---	---	3	---	---	---	.91	---
	---	---	---	7	---	---	---	.48	---	---	---	.13
	---	---	---	12	---	---	---	8	---	---	---	2.42
	---	---	---	5	---	---	---	1.57	---	---	---	.43
	---	---	---	12	---	---	---	9	---	---	---	2.60
Northern Great Plains Area:												
BLM privileges only												
(BLM-Y)(FS-O)..........	---	11	---	---	---	-.50	---	---	---	-.92	---	---
	---	---	13	---	---	---	11	---	---	---	2.05	---
Northwest Area:												
BLM & FS privileges												
(BLM-Sp,S,F,)(FS-S)....	---	29	---	---	---	13	---	---	---	1.99	---	---
	---	---	16	---	---	---	10	---	---	---	1.94	---
Southern Intermountain Area:												
BLM privileges only												
(BLM-Y)(FS-O)..........	10	---	---	---	-48	---	---	---	-8.57	---	---	---
	-1.68	---	---	---	-23	---	---	---	-5.51	---	---	---

1/ January 1 inventory. Sheep numbers in inventory are converted to animal unit equivalents.

2/ Type of ranch defined by pattern of use of public range. To save space "BLM" and "FS" are used to designate Bureau of Land Management and Forest Service. Sp=spring, F=fall, Y=yearlong, O-none, S=summer.

3/ Based on annual feed requirements for the ranch. Total AUM's of feed required for a year, divided by 12 months equals average animal-unit equivalents on the ranch. 4/ Utah. 5/ Wyoming.

income net of cash costs, gross income net of cash costs and depreciation, and gross income net of cash costs, depreciation, and operator and family labor. The rate of return on the investment in each ranch type was also calculated. Income net of cash costs was largest ($37,519) for the 2,148-animal-unit ranch, next largest ($30,613) for the 1,714-animal-unit ranch. Both of these ranches are in the Intermountain area. The lowest net cash income ($699) was for the 27-animal-unit ranch in the Southern Intermountain area. Income net of cash cost increased with ranch size and comparable incomes were received by ranches in the same size groupings. Although income net of cash cost increased as size of ranch increased, average income net of cash cost decreased per animal unit. Income net of cash cost was positive for all ranches. Income net of cash costs and depreciation was positive for all of the sheep ranches except for the 73 animal unit sheep ranch in the Southern Intermountain area. The 73-animal-unit operation had a negative income after depreciation was considered of $-1.68 per animal unit.

Income net of cash cost, depreciation, operator and family labor ranged from $-1,707 for the 73-animal-unit ranch in the Southern Intermountain area to $19,325 for the 2,148-animal-unit ranch in the Intermountain area. Average income net of all costs per animal unit was lowest for the two small ranches in the Southern Intermountain area and highest at $12.77 per animal unit for the 220-animal-unit ranch in the Northwest area. Average net income per animal unit increases with the size of the ranch but variables other than size affect returns per animal unit.

Rate of Return on Investment

The rate of return on investment for ranches with less than 320 animal units of sheep was negative except for the 220-animal-unit ranch in the Northwest area. This ranch received a return on investment of 1.99 percent. The lowest rate of return on investment for ranches 320 animal units or larger was .04 percent for the 320-animal-unit size ranch in the Intermountain area. Rate of return on investment, in general, increased with the size of operation. The highest rates of return on investment were 2.60 percent for the 2,148-animal-unit ranch and 2.42 percent for the 1,714 ranch (table 10).

Summary of Costs and Income

Several generalized statements can be made about costs and income. Total costs per animal unit by size of cattle or sheep operation measured in animal unit equivalents showed marked similarity in amount and a tendency to converge toward a common value regardless of ranch type. A decrease in total cost per animal unit as ranch size increased was also quite evident. These results occurred even though the makeup of the cash and non-cash costs varied significantly among ranch types and areas.

Net returns per animal unit did not exhibit a corresponding stability (tables 7, 8, and 9). The net incomes for the 80 ranch types were not consistent by size or type of ranch organization, or by ranching area. Therefore, averaging of net returns is not meaningful.

The greater correspondence of costs and production per animal unit by ranch type, when costs are grouped by size of ranch and weighted by the number of animal units in each operation, may be due to the fact that production programs of different ranch units, regardless of type, have a relatively fixed time sequence and operational pattern which require inputs of materials and services of the same kinds, and that cash costs in one ranching area tend to be offset by fixed costs in another area. Such consistency was not evident for the net incomes. This is because rates of turnoff are controlled by the quantity and quality of the feed and forage resources. The time pattern and quality sequence in which they appear or are utilized, temperatures and other climatic factors, managerial proficiency, differences in net ranch livestock prices, and many other variables which differ with ranch type and physical environment.

ECONOMIC EFFECT OF AN INCREASE IN GRAZING FEES AND A CHANGE IN PERMITTED LIVESTOCK NUMBERS

The Short-Run Economic Effect

In the short run an increase in grazing fees would increase cash operating cost because no significant changes would be made in the management of the ranch. The amount of the increase in cash operating cost would be equal to the amount of the change in fee times the number of animal unit months in the grazing permit, plus interest on this additional amount of operating capital. 2/ The actual change in cash costs would depend upon: (1) the length of time the livestock are on the Federal ranges; (2) the number of head of livestock permitted or the number of livestock actually grazed; (3) the amount by which the grazing fee is

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2/ It is assumed that the ranch operator will continue to place as many animals on the Public range as before the fee increase.

changed per animal month; and (4) the type of grazing permit held by the ranch unit. The cost change will differ among ranches, depending upon whether the rancher has a permit to graze only on Bureau of Land Management range, a Forest Service permit only, or both a Bureau of Land Management and a Forest Service permit.

Because of the difference in fee charges by the Federal land agencies, type and duration of grazing permits, and in the number of animals permitted on Federal ranges for each type of ranch, the economic effect of a fee increase can only be generalized in the terms set forth above. How the costs and income of western livestock ranches might be affected by an increase in grazing fees is shown in tables 11 and 12. These tables present the economic effect the selected grazing fee increases considered [3] have on cost and not income of the representative ranches developed for the eight ranching areas.

The cash cost of the grazing fees paid, at 1960 fee levels, by the representative ranches was from less than 1 percent of total cash cost up to about 20 percent of total cash cost. The average percentage that present fees were of total cash costs was 4.5 percent for the cattle ranches and 3.19 percent for the sheep ranches. At the .40/.80 level of fees, the fee charges were an average of 7.81 percent of cash operating costs, with a range of 2 to 25 percent, and at the 1.00/1.40 level of fees, the fee charges were an average of 14.84 percent of cash operating costs, with a range of 4.5 to about 40 percent, for the 66 cattle operations. The same fee increases would cause fees to be an average of 5.26 percent at the .40/.80 fee level, with a range of 2 to 8.3 percent and to be an average of 11.0 percent at the 1.00/1.40 fee level, with a range of 3.7 to 16.5 percent (tables 11 and 12).

3/ Only three levels of fee charges are shown in tables 11 and 12. Two additional fee levels were budgeted.

Table 11.- Cattle Ranches: Grazing privileges on public ranges, fees paid, and effects of selected levels of fee increases on costs and income

Item	Unit	Ranching Area and Ranch Type 1/								
		California Area								
		(BLM-0)(FS-S)				(BLM-Sp,S) (FS-0) 2/		(BLM-Sp,S,F) (FS-0) 2/		
Ranch size 3/	A.U.	69	120	235	420	76	277	101	177	323
Grazing privilege 4/										
Bureau of Land Management	AUM's	0	0	0	0	452	550	242	438	220
Forest Service	do.	180	300	400	580	0	0	0	0	855
Fee Level:										
BLM $.20/AUM; FS $.60/AUM 5/										
Fees Paid	Dols.	108	180	240	348	90	110	48	88	557
Fees as a percentage of cash costs	Pct.	2.85	3.08	2.12	1.61	2.30	0.95	1.55	1.14	5.09
Fee Level:										
BLM $.40/AUM; FS $.80/AUM										
Increase in cash costs 6/	Dols.	37	62	82	119	93	113	50	90	574
Fees as a percentage of cash costs	Pct.	3.76	4.06	2.80	2.14	4.49	1.88	3.08	2.23	9.67
Fee Level:										
BLM $1.00/AUM; FS $1.40/AUM										
Increase in cash costs 6/	Dols.	148	247	330	478	372	453	199	360	839
Fees as a percentage of cash costs	Pct.	6.37	6.89	4.80	3.68	10.52	4.51	7.31	5.41	11.64

See footnotes at end of table.

- Continued

Table 11.- Cattle Ranches: Grazing privileges on public ranges, fees paid, and effects of selected levels of fee increases on costs and income - continued

Item	Unit	Ranching Area and Ranch Type 1/							
		Intermountain Area							
		(BLM-S)(FS-0)					(BLM-Sp,F)(FS-S)		
Ranch size 3/	A.U.	122	321	557	881	1,960	104	263	650
Grazing privilege 4/									
Bureau of Land Management	AUM's	525	1,203	1,572	2,934	8,250	199	299	1,476
Forest Service	do.	0	0	420	0	0	156	498	810
Fee Level:									
BLM $.20/AUM; FS $.60/AUM 5/									
Fees Paid	Dols.	105	241	570	587	1,650	133	359	781
Fees as a percentage of cash costs	Pct.	2.52	2.55	3.85	2.19	2.70	3.29	4.51	4.63
Fee Level:									
BLM $.40/AUM;FS $.80/AUM									
Increase in cash costs 6/	Dols.	108	248	587	604	1,699	137	369	805
Fees as a percentage of cash costs	Pct.	4.91	4.96	7.42	4.28	5.26	6.37	8.62	8.84
Fee Level:									
BLM $1.00/AUM; FS $1.40/AUM									
Increase in cash costs 6/	Dols.	433	991	2,348	2,418	6,798	550	1,477	3,219
Fees as a percentage of cash costs	Pct.	11.41	11.51	16.63	10.05	12.15	14.53	19.01	19.45

See footnotes at end of table.

-Continued

Table 11.- Cattle Ranches: Grazing privileges on public ranges, fees paid, and effects of selected levels of fee increases on costs and income - continued

Item	Unit	Ranching Area and Ranch Type 1/								
		Intermountain Area - continued								
		(BLM-Sp,S,F) (FS-0)			(BLM-Sp,S,F,W)(FS-0)			(BLM-F,W,S)(FS-S)		
Ranch size 3/	A.U.	72	233	694	77	264	600	87	236	466
Grazing privilege 4/										
Bureau of Land Management	AUM's	318	1,070	3,354	430	1,668	3,715	268	1,105	2,335
Forest Service	do.	0	0	0	0	0	0	198	530	825
Fee Level:										
BLM $.20/AUM; FS $.60/AUM 5/										
Fees Paid	Dols.	64	214	671	86	334	743	173	539	962
Fees as a percentage of cash costs	Pct.	2.08	2.57	3.34	3.00	5.60	4.86	4.78	8.00	6.57
Fee Level:										
BLM $.40/AUM; FS $.80/AUM										
Increase in cash costs 6/	Dols.	64	214	671	86	334	743	97	337	651
Fees as a percentage of cash costs	Pct.	4.01	4.95	6.36	5.73	10.44	9.13	7.19	12.24	10.42
Fee Level:										
BLM $1.00/AUM; FS $1.40/AUM										
Increase in cash costs 6/	Dols.	254	856	2,683	344	1,334	2,972	384	1,347	2,604
Fees as a percentage of cash costs	Pct.	9.33	11.39	14.37	13.09	22.01	19.87	13.64	22.85	20.24

See footnotes at end of table.

- Continued

Table 11.- Cattle Ranches: Grazing privileges on public ranges, fees paid, and effects of selected levels of fee increases on costs and income - Continued

Item	Unit	Ranching Area and Ranch Type 1/							
		Mountain Area					Northern Great Plains Area		
		(BLM-0)(FS-S)		(BLM-Sp,F)(FS-S)			(BLM-Sp,S,F,W)(FS-0)		
Ranch size 3/	A.U.	95	240	101	271	527	64	181	564
Grazing privilege 4/									
Bureau of Land Management	AUM's	0	0	183	556	1,145	153	403	1,216
Forest Service	do.	260	580	186	498	1,025	0	0	0
Fee Level:									
BLM $.20/AUM; FS $.60/AUM 5/									
Fees Paid	Dols.	156	348	149	410	844	30	81	243
Fees as a percentage of cash costs	Pct.	3.18	3.58	4.66	5.19	5.18	1.03	1.40	1.29
Fee Level:									
BLM $.40/AUM; FS $.80/AUM									
Increase in cash costs 6/	Dols.	54	120	75	217	447	32	83	250
Fees as a percentage of cash costs	Pct.	4.19	4.71	6.78	7.65	7.63	2.07	2.75	2.54
Fee Level:									
BLM $1.00/AUM; FS $1.40/AUM									
Increase in cash costs 6/	Dols.	214	478	302	869	1,788	128	332	1,000
Fees as a percentage of cash costs	Pct.	7.11	7.92	12.63	14.30	14.27	5.06	6.57	6.11

See footnotes at end of table.

- Continued

Table 11.- Cattle Ranches: Grazing privileges on public ranges, fees paid, and effects of selected levels of fee increases on costs and income - continued

Item	Unit	Ranching Area and Ranch Type 1/								
		Northwest Area								
		(BLM-0)(FS-S)			(BLM-Sp,F)(FS-0)			(BLM-Sp,F)(FS-S)		
Ranch size 3/	A.U.	65	180	451	61	181	592	73	185	522
Grazing privilege 4/										
Bureau of Land Management	AUM's	0	0	0	140	292	1,060	99	266	690
Forest Service	do.	120	404	980	0	0	0	232	472	954
Fee Level:										
BLM $.20/AUM; FS $.60/AUM 5/										
Fees Paid	Dols.	72	242	588	28	36	212	159	336	710
Fees as a percentage of cash costs	Pct.	2.21	3.82	3.16	0.91	0.57	0.90	4.76	5.20	3.24
Fee Level:										
BLM $.40/AUM; FS $.80/AUM										
Increase in cash costs 6/	Dols.	25	83	202	29	60	218	68	207	339
Fees as a percentage of cash costs	Pct.	2.92	5.03	4.17	1.80	1.47	1.78	6.61	8.03	4.68
Fee Level:										
BLM $1.00/AUM; FS $1.40/AUM										
Increase in cash costs 6/	Dols.	100	332	808	116	240	872	272	828	1,355
Fees as a percentage of cash costs	Pct.	5.03	8.46	7.06	4.37	4.08	4.33	11.72	15.60	8.72

See footnotes at end of table.

- Continued

Table 11.- Cattle Ranches: Grazing privileges on public ranges, fees paid, and effects of selected levels of fee increases on costs and income

Item	Unit	Ranching Area and Ranch Type 1/							
		Southern Desert Area			Southern Intermountain Area				
		(BLM-Sp,S,F,W)(FS-0)			(BLM-0)(FS-S)		(BLM-0)(FS-Sp,S,F,W)		
Ranch size 3/	A.U.	68	182	423	35	125	118	240	512
Grazing privilege 4/									
Bureau of Land Management	AUM's	452	1,208	2,631	0	0	0	0	0
Forest Service	do.	0	0	0	120	400	1,236	2,556	5,724
Fee Level:									
BLM $.20/AUM; FS $.60/AUM 5/									
Fees Paid	Dols.	90	242	526	72	240	742	1,534	3,434
Fees as a percentage of cash costs	Pct.	3.65	4.89	4.33	4.98	4.86	14.61	17.52	19.73
Fee Level:									
BLM $.40/AUM; FS $.80/AUM									
Increase in cash costs 6/	Dols.	93	249	542	25	82	255	527	1,179
Fees as a percentage of cash costs	Pct.	7.03	9.31	8.29	6.52	6.37	18.56	22.05	24.64
Fee Level:									
BLM $1.00/AUM; FS $1.40/AUM									
Increase in cash costs 6/	Dols.	372	995	2,175	99	340	1,018	2,106	4,717
Fees as a percentage of cash costs	Pct.	15.87	20.33	18.41	10.87	10.79	28.37	32.96	36.22

See footnotes at end of table.

- Continued

Table 11.- Cattle Ranches: Grazing privileges on public ranges, fees paid, and effects of selected levels of fee increases on costs and income - continued

Item	Unit	Ranching Area and Ranch Type 1/					
		Southern Intermountain Area					
		(BLM-Sp,S,F,W)(FS-0)			(BLM-F,W,Sp)(FS-S)		
Ranch size 3/	A.U.	33	260	494	33	206	337
Grazing privilege 4/							
Bureau of Land Management	AUM's	427	1,413	1,728	164	1,057	1,594
Forest Service	do.	0	0	0	113	616	1,213
Fee Level:							
BLM $.20/AUM; FS $.60/AUM 5/							
Fees Paid	Dols.	85	283	346	101	581	1,047
Fees as a percentage of cash costs	Pct.	5.56	4.21	2.55	7.03	10.22	10.90
Fee Level:							
BLM $.40/AUM; FS $.80/AUM							
Increase in cash costs 6/	Dols.	88	291	356	57	345	578
Fees as a percentage of cash costs	Pct.	10.51	8.07	5.98	10.44	15.19	15.80
Fee Level:							
BLM $1.00/AUM; FS $1.40/AUM							
Increase in cash costs 6/	Dols.	352	1,164	1,424	228	1,379	2,313
Fees as a percentage of cash costs	Pct.	22.70	17.92	11.55	19.34	27.17	28.64

See footnotes at end of table.

- Continued

Table 11.- Cattle Ranches: Grazing privileges on public ranges, fees paid, and effects of selected levels of fee increases on costs and income

Item	Unit	Ranching Area and Ranch Type 1/								
		Southwest Desert Area								
		(BLM-Sp,S,F,W)(FS-0)				(BLM-Sp,S,F,W)(FS-0) 2/				(BLM-Sp,S,F,W)(FS-0)
Ranch size 3/	A.U.	170	250	450	725	200	450	700	1,300	1,495
Grazing privilege 4/										
Bureau of Land Management	AUM's	1,690	2,485	4,472	7,206	540	1,224	1,854	3,456	2,700
Forest Service	do.	0	0	0	0	0	0	0	0	0
Fee Level:										
BLM $.20/AUM; FS $.60/AUM 5/										
Fees Paid	Dols.	338	497	895	1,441	108	245	370	691	540
Fees as a percentage of cash costs	Pct.	8.56	9.87	8.04	7.71	2.67	2.46	2.64	2.51	0.11
Fee Level:										
BLM $.40/AUM; FS$.80/AUM										
Increase in cash costs 6/	Dols.	696	1,024	1,843	2,968	222	505	764	1,423	1,112
Fees as a percentage of cash costs	Pct.	21.83	24.61	20.69	19.95	7.59	7.01	7.53	7.15	0.34
Fee Level:										
BLM $1.00/AUM; FS $1.40/AUM										
Increase in cash costs 6/	Dols.	1,741	2,559	4,606	7,422	1,569	1,261	1,910	3,560	2,781
Fees as a percentage of cash costs	Pct.	35.64	39.25	34.11	33.10	29.04	13.07	13.98	13.32	0.67

1/ BLM = Bureau of Land Management, FS = Forest Service, Sp = Spring, S = Summer, F = Fall, W = Winter, Y = Yearlong, 0 = None.

2/ Ranches using "Section 15" land outside of organized BLM districts.

3/ Based on annual feed requirements for the ranch. Total AUM's of Feed required for a year, divided by 12 months = Average animal unit equivalents (A.U.) on the ranch.

4/ AUM for Administrative purpose of BLM and FS. Equals one animal 6-months or older, for one calendar month. These AUM's do not equate with AUM's determined on a basis of feed requirements or feeding standards.

5/ Average 1960 Fee Levels.

6/ Depreciation and family labor charges do not change in the short-run. Therefore, these figures also represent the decrease in annual income.

Table 12.-Sheep Ranches: Grazing privileges on public ranges, fees paid, and efforts of selected levels of fee increases on costs and income

Item	Unit	Ranching area and ranch type 1/							
		Intermountain area							
		(BLM-F,W,Sp) (FS-S) 2/		(BLM-F,W,Sp)(FS-S) 3/					
Ranch size 4/	A.U.	320	717	258	677	1,714	2,148	886	1,714
Grazing privileges: 5/									
Bureau of Land Management	Aum's	1,625	3,463	888	3,545	9,204	12,156	5,050	10,250
Forest Service	Aum's	590	1,347	551	1,035	2,622	3,066	1,356	2,091
Fee level: BLM $.20/Aum; FS $.60/Aum 6/									
Fees Paid	Dollar	679	1,500	509	1,330	3,414	4,271	1,824	3,305
Fees as a percentage of cash costs	percent	5.20	4.57	3.80	3.97	4.17	4.32	4.16	3.97
Fee level: BLM $.40/Aum; FS $.80/Aum									
Increase in cash costs 7/	Dollar	456	991	296	943	2,437	3,137	1,318	2,542
Fees as a percentage of cash costs	percent	8.31	7.28	5.82	6.52	6.86	7.17	6.87	6.74
Fee level: BLM $1.00/Aum; FS $1.40/Aum									
Increase in cash costs 8/	Dollar	1,825	3,963	1,154	3,773	9,745	12,543	5,278	10,168
Fees as a percentage of cash costs	percent	16.48	14.53	11.20	13.40	14.06	14.77	14.13	14.12

See footnotes at end of table

Table 12.-Sheep Ranches: Grazing privileges on public ranges, fees paid, and efforts of selected levels of fee increases on costs and income

Item	Unit	Ranching Area and ranch type 1/					
		Northern Great Plains Area		Northwest area		Southern Intermountain Area	
		(BLM-Y)(FS-C)		(BLM-Sp,F)(FS-S)		(BLM-Y)(FS-C)	
Ranch size 4/	A.U.	229	482	220	396	27	73
Grazing privileges: 5/	Aum's						
Bureau of Land Management	Aum's	471	1,145	524	851	191	548
Forest Service	Aum's	0	0	362	600	0	0
Fee level: BLM $.20/Aum; FS $.60/Aum 6/							
Fees Paid	Dollars	89	218	322	530	7 7/	79 7/
Fees as a percentage of cash costs	Percent	0.89	1.17	2.68	2.12	0.96 7/	2.74 7/
Fee level: BLM $.40/Aum; FS $.80/Aum							
Increase in cash costs 8/	Dollars	97	236	83	340	7	81
Fees as a percentage of cash costs	Percent	1.81	2.37	3.33	3.39	1.89	5.33
Fee level: BLM $1.00/Aum; FS $1.40/Aum							
Increase in cash costs 8/	Dollars	388	943	730	1,360	22	324
Fees as a percentage of cash costs	Percent	4.48	5.79	8.10	7.01	3.69	12.27

1/ BLM=Bureau of Land Management; FS=Forest Service; Sp=spring; S=summer; F=fall; W=winter, Y=Sp,S,F, and W; C=none. 2/ Utah. 3/ Wyoming. 4/ Based on annual feed requirements for the ranch. Total Aum's of feed required for a year, divided by 12 months = average animal unit equivalents (A.U.) on the ranch. 5/ An Aum for administrative purposes of BLM and Fs equals 5 sheep 6 months or older for one calendar month. These Aum's do not equate with Aum's determined on a basis of feed requirements or feeding standards. 6/ Average 1960 fee levels. 7/ Initial 100 head of sheep granted free use for Navajo sheep operators. 8/ Depreciation and family labor charges do not change in the short-run. Therefore, these represent the decrease in annual income.

An example of the effect on costs of the four levels of fee changes that were considered in the study is shown in table 13 for two types of Intermountain ranches.

Table 13.- Net added cost effect of four levels of fee increases on two types of Intermountain ranches, 1960

Ranch type	Size of ranch		Net increase in cash cost with fees at:			
	Animal units	Paid AUM's	.40/.80	.60/1.00	.80/1.20	1.00/1.40
	No.	No.	Dollars	Dollars	Dollars	Dollars
BLM & FS privileges	104	355	137.40	274.80	412.21	549.61
(BLM-Sp, F)(FS-S)	623	797	369.36	738.72	1,108.07	1,477.43
	650	2,286	804.64	1,609.27	2,413.91	3,218.54
BLM privileges only	122	525	108.15	216.30	324.45	432.60
(BLM-S)(FS-O)	321	1,203	247.82	495.64	743.45	991.27
	557	1,998	587.10	1,174.20	1,761.30	2,348.40
	881	2,934	604.40	1,208.81	1,813.21	2,417.82
	1,960	8,250	1,699.50	3,399.00	5,098.50	6,798.00

From these data and the data in tables 11 and 12 can be seen the significance of the economic effect of fee increases. At the present fees, and at the two levels of fee increases considered, all of the sheep and cattle ranches budgeted would still cover cash costs, but at the highest fee level (1.00/1.40) one sheep ranch and four cattle ranches would not cover cash cost plus depreciation.

A reduction in the permitted use of public ranges, in numbers of head of livestock, has the same effect on the capital value of a ranch that is subjected to the reduction as can occur with an increase in grazing fees, given the same restrictive assumptions about management practices. The impact of a permit reduction is much more complex to trace out and reasons for the effect it has are not quite as evident as a fee increase. As with grazing fees, cash costs would change and in addition so would certain non-cash costs. The gross income of each of the representative ranch types for which a reduction of the grazing permit was made was reduced (tables 14 and 15).

The effect of a reduction in permitted use on the number of head or the composition of the livestock inventory, in this case 20 percent of the actual permitted livestock numbers, might be less than, or it might be as much as, the number of head of livestock by which the permit is reduced. [4/] For most of the ranches which were subjected to the 20 percent of actual use reduction, the effect on inventory numbers was less than the full 20 percent reduction in permitted numbers. The effect of the 20 percent reduction in the permit on inventory numbers and inventory composition for three sizes and types of California and Intermountain cattle operations is shown in table 16.

The nature of the effect on the cattle inventory would be determined by the class of animals placed on the public range and by the duration of the grazing permit, primarily by the length of time the animals are permitted on the public range. Reductions in animal unit equivalents in representative ranch inventories were directly related to the time length of grazing permits. On the average, the reduction amounted to 8.3 percent times the number of months of permitted use times the number of head of livestock affected by the permit reduction. [5/] The maximum reduction in

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[4/] The reduction is 8.3 percent of the number of animals removed from the public range for every full month's duration of the permit, i.e., a yearlong permit would usually cause a 20 percent reduction in inventory numbers.

[5/] Example: permitted head 100 and a six months grazing permit with a 20 percent reduction in permitted use, generally, causes a reduction in the livestock inventory of about 10 head: 100 X .20 X 6 X .083 = 9.96 head. This number was originally found by multiplying: $\frac{100 \times .20 \times 6}{12} = 10$. This is a first approximation only. The actual reduction depends upon how much feed is released and upon the seasons at which it is released.

Table 14.- Cattle ranches: Effects on ranch income and expenses of a 20 percent reduction in actual use of public ranges assuming the herd would be reduced in size

Ranching area and type of ranch 1/	Size of ranch in A.U. equiv. 2/	Change in gross ranch income	Change in cash costs	Change in depreciation	Change in income net of cash costs, depreciation and family labor
	Number	Dollars	Dollars	Dollars	Dollars
California Area 3/					
FS privileges only					
(BLM-O)(FS-S)	69	-736	-438	0	-298
	120	-1,424	-610	-84	-730
	235	-1,969	-1,096	-84	-789
	420	-3,313	-1,742	-168	-1,403
BLM-Sp,S,F,)(FS-O) 4/	101	-416	-56	0	-360
	177	-833	-112	0	-721
	323	-1,874	-253	0	-1,621
Intermountain Area					
BLM privileges only					
(BLM-S)(FS-O)	122	-902	-430	-26	-746
	321	-2,004	-286	-57	-1,661
	557	-3,307	-476	-95	-2,736
	1,980	-4,910	-848	-104	-4,062
		-13,829	-1,991	-396	-11,442
(BLM-Sp,S,F)(FS-O)	72	-465	-51	0	-432
	233	-1,360	-5,109	-96	-1,155
	694	-5,000	-343	-300	-4,357
(BLM-Sp,S,F,W)(FS-O)	77	-337	-68	0	-271
	264	-1,355	-284	-83	-988
BLM & FS privileges	800	-2,889	-744	-255	-1,890
(BLM-Sp,F)(FS-S)	104	-546	-76	-30	-440
	263	-1,457	-203	-80	-1,174
	650	-4,371	-610	-239	-3,522
(BLM-F,W,Sp)(FS-S)	87	-21	-107	0	87
	236	-825	-173	-101	-551
	466	-2,102	-351	-158	-1,593
Mountain Area					
FS privileges only					
(BLM-O)FS-S)	95	113	-66	0	179
	240	-92	-129	-75	112
BLM & FS privileges					
(BLM-Sp,F)(FS-S)	101	-176	-33	0	-143
	271	-686	-65	0	-622
	527	-1,403	-115	-88	-1,200

Continued

Table 14.- Continued

Northwest Area					
FS privileges only					
(BLM-O)(FS-S)	65	-144	-47	0	-97
	180	-485	-165	0	-320
	451	-1,122	-376	0	-746
Southern Desert Area					
BLM privileges only					
(BLM-Y)(FS-O)	68	-367	-96	0	-271
	182	-1,177	-283	-163	-731
	423	-4,244	-575	-150	-3,519
Southern Intermountain Area					
FS privileges only					
(BLM-O)(FS-S)	35	-18	-54	0	36
	125	-1,027	-194	-65	-768
(BLM-O)(FS-Y)	118	-969	-317	-65	-587
	240	-2,101	-651	-130	-1,320
	512	-4,237	-1,463	-195	-2,579
BLM privileges only					
(BLM-Y)(FS-O)	33	-192	-57	0	-134
	260	-1,198	-299	-68	-831
BLM & FS privileges	494	-1,529	-297	-123	-1,109
(BLM-F,W,Sp)(FS-S)	33	-166	-133	0	-33
	206	-2,135	-407	-99	-1,629
	337	-3,302	-660	-239	-2,403
Southwest Desert Area					
BLM privileges only					
(BLM-Y)(FS-O) 4/	170	-1,101	-244	-20	-837
	250	-1,687	-335	-29	-1,323
	450	-3,015	-571	-39	-2,405
	725	-4,900	-911	-92	-3,897
(BLM-Y)(FS-O) 4/	200	-734	-129	-24	-581
	450	-1,656	-290	-49	-1,317
	700	-2,494	-408	-64	-2,022
	1,300	-4,658	-3,751	-139	-768

1/ Type of ranch defined by pattern of use of public ranges. Sp=Spring, S=summer, F=fall, W=winter, Y=year long, O=none.

2/ Based on annual feed requirements for the ranch. Total AUM's of feed required for a year, divided by 12 months equals average animal-unit equivalents on the ranch.

3/ BLM=Bureau of Land Management and FS=Forest Service.

4/ Ranches using "Section 15 lands," lands outside organized grazing districts.

TABLE 15 Sheep ranches: Effects on ranch income and expenses of a 20 percent reduction in actual use of public ranges, when the size of the herd is reduced

Ranching area and type of ranch 1/	Average Equivalent 2/	Change in			
		Total ranch income	Cash Costs	Depreciation	Income net of cash costs, depreciation and family labor
	Number	Dollars	Dollars	Dollars	Dollars
INTERMOUNTAIN AREA------------					
BLM & FS privileges 3/------					
(BLM-F,W,Sp)(FS-S) 5/----	320	-5,134	-755	-152	-4,227
	717	-10,760	-3,140	-225	-7,395
(BLM-F,W,Sp)(FS-S) 4/----	258	-1,596	-298	-137	-1,161
	677	-4,950	-1,580	-687	-2,683
	1,714	-12,086	-5,232	-413	-6,441
	2,148	-17,628	-8,094	-620	-8,914
	886	-7,343	-2,792	-257	-4,294
	1,714	-12,442	-5,431	-469	-6,542
NORTHERN GREAT PLAINS AREA----					
BLM privileges only---------					
(BLM-Y)(FS-O)------------	229	-609	-94	-39	-476
	482	-1,363	-275	-92	-996
NORTHWEST AREA---------------					
BLM & FS privileges---------					
(BLM-Sp,F)(FS-S)----------	220 5/	---	---	---	---
	396	-2,609	-344	-164	-2,101
SOUTHERN INTERMOUNTAIN AREA---					
BLM privileges only---------					
(BLM-Y)(FS-O)------------	27	-79	-26	0	-53
	73	-523	-298	-10	-215

1/ BLM=Bureau of Land Management; FS=Forest Service; Sp=spring; F=fall; W=winter; Y=yearlong; O=none.

2/ Based on annual feed requirements for the ranch. Total AUM's of feed required for a year divided by 12 months = average animal-unit-equivalents on the ranch.

3/ Utah

4/ Wyoming

5/ No adjustment in permitted use made on this ranch.

Table 16.- Effect of a 20-percent reduction in permitted use on January 1 inventory numbers of cattle for three sizes and types of California and Intermountain cattle ranches

January 1 inventory by class of livestock	263 Animal unit (BLM-Sp,F) (FS-S)1/		881 Animal unit (BLM-S) (FS-O)2/		177 Animal unit (BLM-Sp,S,F) (FS-O)3/	
	Before	After	Before	After	Before	After
	No.	No.	No.	No.	No.	No.
Cows	149	133	500	453	100	92
Heifers	26	23	90	81	13	12
Replacement heifers	31	27	92	83	14	13
Yearlings	19	17	243	218	41	38
Bulls	9	8	22	20	4	4
Horses	6	4	12	12	4	4

1/ Grazing permit was reduced 184.5 animal unit months of grazing.

2/ Grazing permit was reduced 588 animal unit months of grazing.

3/ Grazing permit was reduced 87.5 animal unit months of grazing.

inventory numbers would most likely occur when the grazing permit is yearlong.

A reduction in numbers of animals permitted to graze might have several types of effects. If numbers of animals in livestock inventories must be reduced, both cash costs and some elements of non-cash costs such as depreciation on purchased bulls would be reduced. Net income also would change. With the inventory reduction that would be needed on the representative ranches, even when full use of the capacity of the resources was maintained, the net effect of the 20-percent cut in actual permitted range use on net income was as great, and in most cases greater, than the effect of the highest level of grazing fees evaluated.

In the event a rancher would not reduce his inventory, then, of course, he would need to purchase additional feed or rent additional pasture or range. Should the costs of these alternatives be just equal to the fees that he would have normally paid net income would not be reduced. But should the costs of these alternatives be higher than the fees he would normally have paid, net income would be reduced in much the same way as if he had reduced his inventory numbers.

An animal can be retained in the inventory up to the point where the added cost just covers its net value at the time of the grazing permit reduction, but no longer. This relationship is identical to consuming the capital that would normally go into a depreciation account. This type of capital consumption can be continued only to the point

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6/ At the third assumed level, Bureau of Land Management fees were $1.00 and Forest Service fees $1.40 per animal unit month.

where the cost of maintaining the animal is just equal to its value. As with grazing fees, if a ranch has excess or unnecessary costs, the elimination of these costs can provide a means of at least partially absorbing the impact of a reduction in the grazing permit.

These alternatives, inventory reductions, land rentals, cost efficiency measures, or the purchase of feed, are the main short-run adjustment possibilities.. Land sales or purchases are other possible alternatives, but a change in the capital structure of the representative ranches was not considered.

The Long-Run Economic Effect

The above discussion has considered only the short-run effects of fee increases and reduction in permitted use. In the longer run, when sufficient time has passed that the effect of the fee increase has been fully translated into the capital structure of a ranch, the economic effect of an increase in grazing fees becomes a capital loss rather than a reduction in income net of all costs. If the cost accounting process goes no further than gross returns less cash costs, the only effect that is apparent is the increase in cash costs. If, however, the estimating procedure to determine the effect of an increase in fees is carried out further it becomes evident that the final effect would be that the base properties, notably land, would be devalued and that the result would be a capital loss. The total capital loss most likely, theoretically, would be an amount of capital value equal to the capitalized increase in fees. [7]

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[7] Example: A fee increase of 20 cents for 1 animal unit month would cause a capital loss of $4 when the 20-cent fee increase is capitalized at a 5 percent interest rate. .20/.05 = $4.00. Four dollars invested at 5 percent interest will yield an annual return of 20 cents. If a ranch which is valued at $100,000 for land and permanent improvements and an interest rate of 5 percent is accepted, interest on investment is $5,000. If this ranch has a permit for 100 animal unit months of grazing and if grazing fees are increased 20 cents per animal unit month, cash costs are increased by $20.60: .20(100) + .06/2 (20.00) = $20.60. The capitalized value of $20.60 is $412: $20.60/.05 = $412.00. Interest on operating capital is now (the economic effect being fully translated): $4,979.40. .05($100,000 - $412) = $4,979.40.

As a consequence, interest on investment for the devalued property will be reduced by an amount just equal to the cost increase in fees.

In the longer run, more intensive use of capital, for such practices as reseeding, fertilization, brush and weed control, and fencing and water development might allow the inventory to be rebuilt or even increased. The practicability of these measures has been demonstrated but the necessary physical and economic conditions must be present. Since, also, the productivity per animal unit is functionally related to stocking levels and to the normal growth curve of the animal, a possibility exists that as much or more net income might be obtained from fewer animals. Prices and costs are an integral part of all such evaluations. For example, if $100 of net value of product is given up because a cow is removed from the herd after the grazing permit is reduced, the remaining cows of the livestock inventory would have to make up this loss in order for the rancher's income to remain unchanged. This could be done by an increase in productivity per animal unit remaining, either through an increase in weight or grade, or through an increase in calving percentage of the remaining cow units. To the net value of these added products, if any, must be added any decreases in costs (expressed in cents per pound) that are associated with the herd reduction.

Eventually, however, if reduced net incomes occur, a capital loss would occur--the ranch properties would be worth less by an amount equal to the capitalized value of the change in net income. This reduction in capital value might not be the same for all ranch units. Also, ranch property values might not change for reasons other than those associated with net income from livestock production. These reasons are associated with the whole complex and the direction of development of the surrounding agricultural and urban environment.